Vol. 4 JANUARY, 1923 TECHNOLOGY DEPARTMENT No. 10

THE PAPER INDUSTRY

The Monthly Educational Journal of the Paper Industry.

The
Moore & White
Company

Solicits your inquiries for Paper & Pulp Mill Machinery, which will be given their most careful consideration; and takes this occasion to extend the Compliments of the Season to all the Paper & Pulp Manufacturers

PHILADELPHIA, PA., U.S.A.

The
Suction Box Oscillator

Often Lowers
Wire Guide Repairs
Through Keeping
a Smooth Edge
on the Wire

BELOIT IRON WORKS, Beloit, Wis.

Builders of
Paper Making Machinery
Since 1858

Nordberg Uniflow Poppet Valve Engines

Engine Efficiency Starts with Proper Selection

NORDBERG UNIFLOW ENGINES are especially suited for paper mill drives, because:

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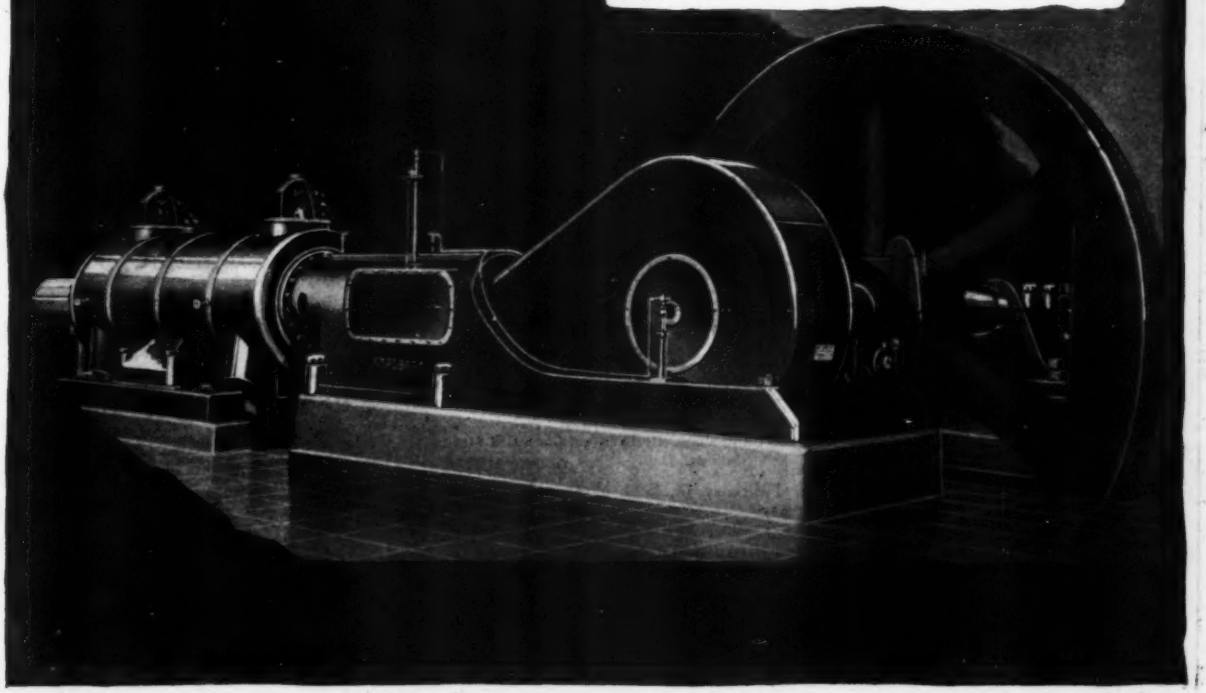
4. They can be operated either condensing or non-condensing, with any desired back pressure.

Write for our Bulletin RY-1. Nordberg Engineers will be glad to confer with you on your special problems.

Nordberg Manufacturing Co.
Milwaukee, Wisconsin



Vol. 4—No. 10

THE PAPER INDUSTRY

A. SCOTT DOWD
Editor

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of the Pulp and Paper Industry

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Eastern Office: 53 Park Place, New York City

NATIONAL U.S.A. DYES

The Latest Paper Shade Card

A LITTLE more than a year ago a paper shade card containing 52 colors and 144 dyeings was issued by this Company. Up to that time this card was the most complete exhibit of paper dyes ever distributed.

The development of new paper dyes has made necessary an enlarged edition. The new card shows 99 dyes, each dye in two strengths, totaling 198 dyeings, which for convenience are classified into 4 groups:

34 Acid Colors
33 Basic Colors
27 Direct Colors
5 Sulfur Colors

The sulfur dyes were added to take care of those instances where it is essential to produce, at a low cost, shades of excellent fastness, especially to light. We shall be pleased on request to give those interested the results of our tests with sulfur dyes.

This card is being distributed to our customers. If you do not receive a copy please write for one.

National Aniline and Chemical Company, Inc.

40 Rector Street, New York, N. Y.

New York *Chicago* *Charlotte* *Toronto* *Philadelphia*
Boston *Hartford* *Montreal* *Providence* *San Francisco*

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Week Commencing

APRIL 9th-1923

GRAND CENTRAL PALACE

NEW YORK CITY

Management

INTERNATIONAL EXPOSITION CO.

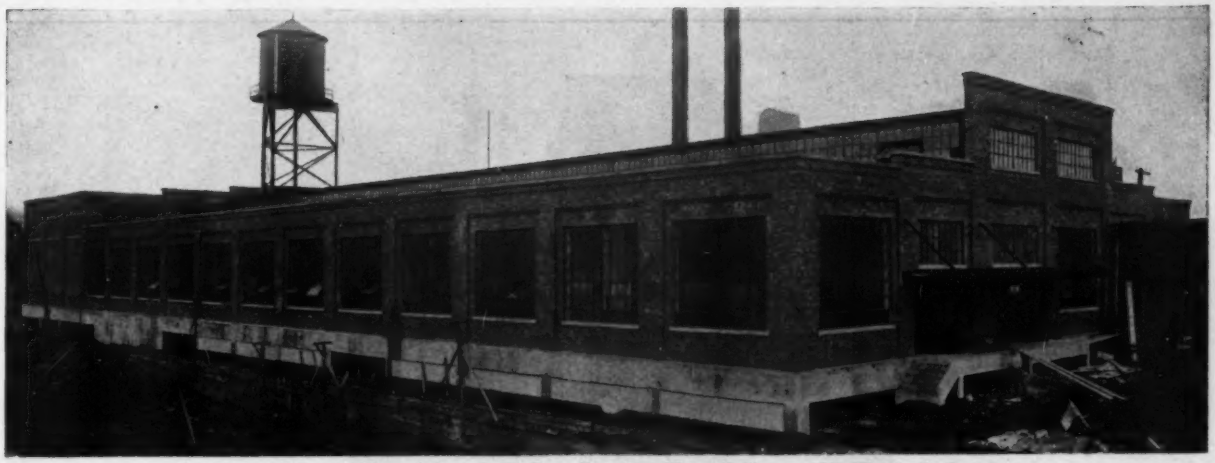
Featuring the paper making industry from forest to the finished product

For floor diagram and complete information about exhibit space — address

PAPER INDUSTRIES EXPOSITION

Grand Central Palace

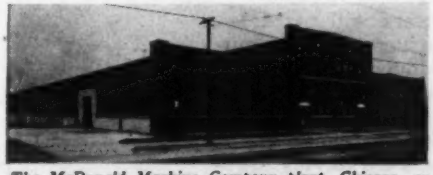
New York City



One of several plant buildings of the A. P. W. Paper Company, Albany, N. Y., erected by The Austin Company.

Melrose Park (Illinois), branch plant of the Richardson Company, completely designed, built and equipped by The Austin Company. Austin is now building another branch plant unit for this company at New Orleans.

Complete plant of the Chillicothe Paper Company, Chillicothe, Ohio, designed, built and equipped by The Austin Company.



The McDonald Machine Company plant, Chicago, an Austin No. 10 Standard Building. Width of this type 150 ft. can be varied in multiples of 50 ft.—length in multiples of 20 ft.

5 Austin Contracts Under Way in the Paper Industry

Evidence of Austin construction ability in the Paper Industry will be found in the fact that five contracts are now under way and several others were recently completed. These construction operations are as follows:

(1) For the Richardson Company at New Orleans—a new plant unit.

(2) For the Oswegatchie Paper Company, at Gouverneur, N. Y., —rebuilding a plant that was recently destroyed by fire at Natural Dam, New York.

(3) For the Ideal Corrugated Box Company, at Parkersburg, West Virginia—an additional plant unit.

(4) For the Simplex Paper Corporation at Palmyra, Michigan—a new plant building.

(5) For the Holyoke Gummed Products Company at Holyoke, Mass.—a plant building.

Austin experience in the Paper Industry can be applied equally well to your problem—no matter when you may require additional facilities, one of the ten (strategically located) Austin Branch Organizations can serve you with economy and dispatch. Phone, wire or use the coupon.

THE AUSTIN COMPANY, Cleveland

Engineers and Builders

Chicago	1374 Continental and Commercial Bank Bldg.
Cleveland	16112 Euclid Avenue
Detroit	1954 Penobscot Building
Pittsburgh	493 Union Arcade
Philadelphia	1026 Bulletin Building
New York	217 Broadway
Dallas	627 Linz Building
St. Louis	1794 Arcade Building
Seattle	1603 L. C. Smith Building
Birmingham	1317 Jefferson Bank Building

THE AUSTIN COMPANY OF CALIFORNIA
702 Pacific Electric Building, Los Angeles

THE AUSTIN METHOD

AUSTIN

ENGINEERING BUILDING EQUIPMENT

THE AUSTIN COMPANY, Cleveland

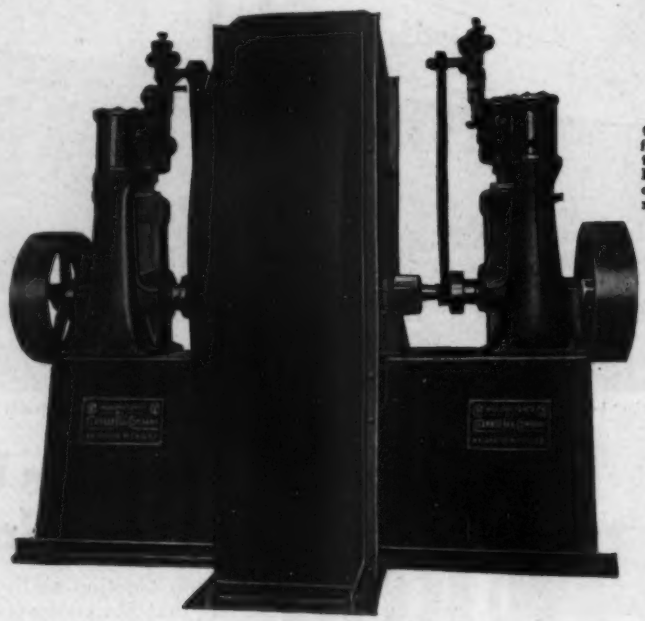
Gentlemen: We are interested in the erection of a.....buildings ..... x ..... ft., ... stories high, and would be pleased to receive a copy of the new edition of "The Austin Book of Build-ings" without obligation. ☐ We are interested in branch plants and warehouses, and would appreciate receiving additional literature and information.

P.I. 1-23

Firm.....

Individual.....

Address.....



Clarage forced draft fan direct - connected to a Clarage Type U Engine—the unfailing combination for paper mills.

Better fans—better men

WHAT steam is to an engine, air is to a man. A steam engine with half enough steam—impossible! A man with half enough air—common!

Without considering the humanitarian side, viewed merely from a standpoint of dollars and cents, a high priced man deprived of good air and good ventilation is, like an undersupplied engine, a bad investment.

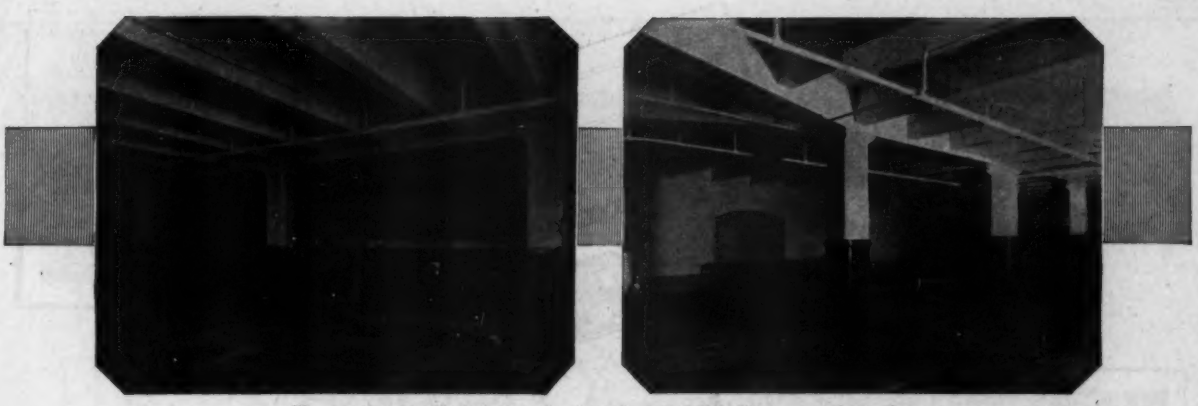
Clarage Blower Systems keep paper mills at just the right temperature during the coldest or the hottest days. Clarage systems cover every requirement—can be used for ventilating alone, or for heating and ventilating as well as humidifying. Regardless of the type or size of installation there is no deviation from the essential of good working conditions—a generous supply of air from out-doors, uniformly supplied to every part of the mill.

Clarage engineers will place before you an unsurpassed accumulation of data covering ventilating systems of every type involving fan equipment. They will also tell you why, in paper mills, Clarage Systems are solving problems of roof drying, moisture absorption, paper stock conveying, calender roll cooling and mechanical draft. The scope of Clarage equipment is forcibly brought out by the bulletins. Write for them.

Clarage Fan Co., Kalamazoo, Michigan

Branch offices in principal cities

CLARAGE—KALAMAZOO Multiblade Fans



These two unretouched photographs show the remarkable difference made by the application of Surlight—the whitest mill-white paint made.

Pure White Paint that Stays White

Surlight is the whitest mill-white paint made. This is an actual fact that is open to demonstration—results will show that in every case, under similar conditions and service, Surlight is whiter when applied, whiter when dry and stays white longer than any paint or enamel you can buy.

The ability of Surlight paint to *stay white* is responsible for many real savings. It makes every wall a light reflector—daylight is caught from all angles and diffused in soft, restful rays to workers' machines and benches. This naturally helps to increase production—in many cases as much as 8 to 12%. The light-reflecting properties of Surlight tend to reduce spoilage and this is an important factor in reduction of losses in both labor and material.

The factory interior brightened with pure white Surlight paint provides a cheerful, sanitary atmosphere—it helps to lighten corners and areas that were formerly dark and removes the temptation to allow dirt and rubbish to accumulate.

Surlight paint lasts long and eliminates the necessity of frequent repainting. It forms a tough defensive coat that dries to a smooth, hard, non-porous surface, which will not collect dust, dirt or flying particles. It will not peel, check, crack, flake or fall off.

The Surlight Book
This book should be in the hands of everyone interested in mill-white paint for textile use. Send for copy.

Get This Interesting Book

We have prepared a very interesting book on the subject of Surlight paint—what it is, what it does and various considerations of the effects that follow its use. Send for this book—it will be mailed gratis on request.

We also manufacture a complete line of paints, varnishes and enamels for use in paper mills.

ST. LOUIS SURFACER & PAINT CO.
4204 Arlington Ave. **St. Louis, Mo.**

SURLIGHT

The Light Reflecting Wall Paint for Industrial Purposes

This book—

is the link between the power plant and the main office

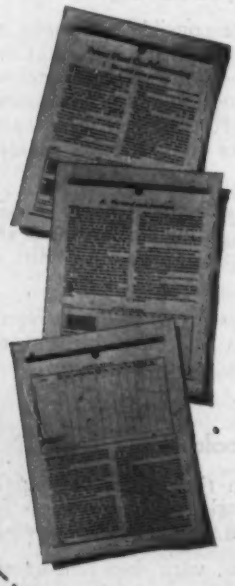
THE power plant engineer's job is what he ***makes*** it. It can end with the dull routine of firing boilers and turning valve handles or it can become the big cog in the production machine!

The subject of this new booklet—power plant cost accounting—supplies a link between two branches of manufacturing that have been too self-centered. The application of power plant accounting will enable the operating man to educate the manufacturer of steel, paper, textiles, or whatever product it may be to the basic but slighted fact that steam generation is a ***manufacturing process*** worthy of more consideration and better equipment.

The simple methods outlined in this book will bring greater attention to the power plant—with greater attention, larger appropriations for new equipment—with better equipment, greater economies—with greater economies, a better job for the engineer!

The basic principles of cost accounting as applied to power plant operation are covered briefly but thoroughly in this book—some pages of which are shown opposite. Note that illustrative forms are included. The system outlined was developed by the engineers of the Republic Flow Meters Company in collaboration with consulting engineers and accountants familiar with the requirements of different industries.

Just mail the coupon to—



do it now

Republic Flow Meters Co., 2220 Diversey Parkway, Chicago
Please send immediately a copy of "Power Plant Cost Accounting."

Company .....
Address .....
Your Name and Position .....
.....
.....

P Ind 1-23

Republic Flow Meters Company
2220 Diversey Parkway · Chicago

THE SECRET OF ITS DURABILITY

AUTHENTIC data from over 250 years of service prove that cast iron becomes coated with rust but remains practically unimpaired in weight and strength under conditions that are fatal to other kinds of pipe.

Scientists believe this phenomena due to what has been termed the "mechanical theory of corrosion." Cast iron possesses a structure of the same granular or crystalline form as found in the iron ore from which it is made and which has laid unimpaired in the ground for untold centuries. Cast iron rusts on the surface, but the corrosive agent fails to break the natural mechanical bond between the irregular shaped granules, further oxygen is excluded by the first rust coating and therefore corrosion stops. Cast iron literally coats itself.

The reason the same thing does not occur on wrought iron or steel is that the "mechanical structure" of these metals is different. In place of the interlocked grains or crystals of cast iron, wrought iron and steel are found to be of a fibrous and, in thinly rolled steel, of a laminated structure with distinct leaves overlapping each other. As corrosion takes place, these leaves or fibres scale off, constantly presenting a fresh surface to the corrosive agent. The manipulation or working of this metal in the process of its manufacture thus has unfitted it to form its own protective coating, as does cast iron.

Photomicrograph of cast iron, much enlarged, showing granular structure

Photomicrograph of wrought iron, much enlarged, showing fibrous structure

Drawing of a piece of sheet steel, much enlarged, showing surface and sectional structure with a typical pit

Solving pipe problems is the business of our Research Department.
We welcome an opportunity to coöperate with paper mill operators.
Write for Illustrated Catalogue "P" Describing 2" Cast Iron Pipe

AMERICAN CAST IRON PIPE COMPANY

BIRMINGHAM, ALA.

DISTRICT OFFICES IN PRINCIPAL CITIES

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in the
Paper Industry

115 Broadway, New York

1421 Chestnut Street
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208 South La Salle Street
CHICAGO

58 Sutter Street
SAN FRANCISCO

Make a Profit in 1923!!

BUT this year, 1923, what will it be? Profitable or unprofitable? This is the one supreme question of the hour at this time of the year.

It depends upon what you mean by profitable.

We believe that a profitable year is one in which the industry as a whole can produce its goods and market them at a gain over the cost thereof. And with that definition in mind we unhesitatingly reply that from the present outlook, 1923 is to be a profitable year, **providing**, first and last that the producing units of manufacture in the industry will each remember the tragic lesson of the last three years, which is that if they continue to sell goods at or below cost they will surely land in the financial cemetery.

Let us make this a little more specific.

Profit is to business as blood is to the human body. If, therefore, you let the blood out of a body as fast as it is produced the body will die. And any manufacturer who produces paper or any other commodity and continues to sell it below cost will not only fall into the hands of the financial undertaker, but he also helps assassinate the profits of all other factories in his line. It is the spectacle of the man who finds himself drowning, grabs good swimmers about the neck and pulls them down to destruction in the whirlpool with himself, simply because he would not learn to swim when he could and should.

We have had a two years' struggle with ignorant, willful business assassins and pirate price cutters, men who either don't known their costs or if they do, don't know the first principle of business, which is to make a profit.

This is the beginning of a profitable year; it is the alpha of the industry, so to speak. The ending, the omega of the 1923 activities, all depends upon this prime factor of profit. Never since the war began has there been a better business outlook. But unlike the war years, there are no artificial stimuli for profit.

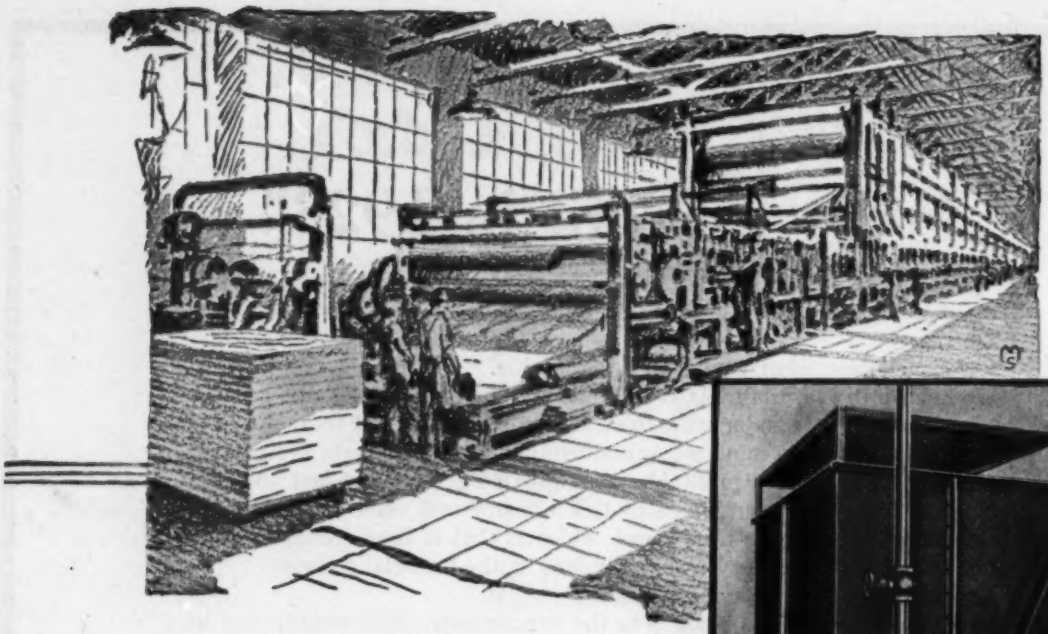
Profit depends upon the proprietor knowing what he is doing and doing it at a profit.

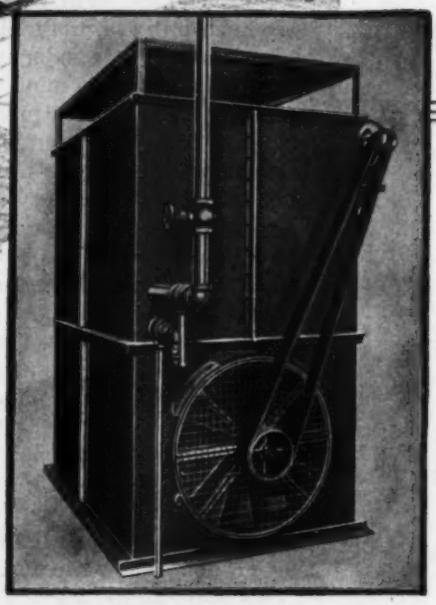
Business can be done, is being done and must be done at a profit.

Any man possessing only as much brains as God gives to ordinary gray goslings can make articles at a price and sell them at a loss. But a profitable business man in a profitable business year, with average intelligence, a bit of grit and a sharp pencil, ought to come through with a profit.

And how we do need profitable business men! Men of that kind are a distinct asset to the industry at large and business in general. They are benefactors to the nation and the world. It ought to be a crime punishable by slow starvation for any man or set of men to sell below cost during otherwise profitable years.

Therefore, we have inserted the above proviso in predicting a profitable year for 1923. For what doth it profit a firm if they do the whole volume of business in their line and lose their profits? Nothing! Absolutely nothing!!





Built as a complete unit with a series of pipe coils arranged on the counter floor principle which may be heated with exhaust or live steam, or hot water. The American Blower Portable Heating Unit maintains comfortable working conditions without disturbing floor dust or creating drafts. The fan, which draws the cold air into the unit, may be operated by any power available.

A Complete Heating System

Do you require additional heat for any part of your paper mill? An American Blower Portable Heating Unit will solve the problem.

Are you supplying warmed dry air to your machine room, replacing that exhausted with the water vapors? An American Blower Portable Heating Unit will do it.

It will help keep your mill free from fog and moisture and maintain comfortable conditions with a minimum expenditure of power. It is easily installed; portable and adaptable for all types of buildings.

Have you received a copy of our bulletin describing the American Blower Portable Unit? It is well worth reading.

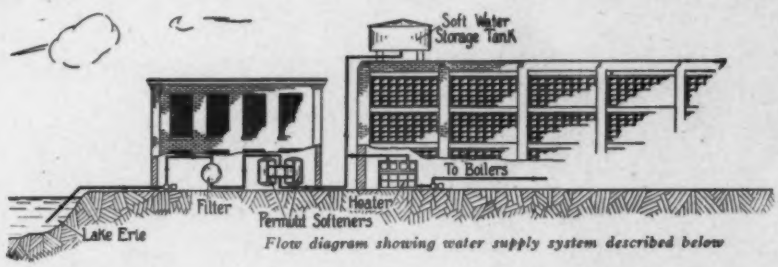
AMERICAN BLOWER CO., DETROIT
BRANCH OFFICES IN ALL PRINCIPAL CITIES
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

(191)

American Blower

"Sirocco" TRADE MARK

EXHAUSTERS · VENTILATING FANS · AIR WASHERS · BLOWERS · ENGINES
FOR HEATING, VENTILATING, DRYING, AIR CONDITIONING, MECHANICAL DRAFT



Flow diagram showing water supply system described below

Not a Single Boiler Tube Replaced in 4800 H. P. Boiler Plant Since 1920

A large industrial corporation in Buffalo, N. Y., operates a boiler plant consisting of six Stirling, vertical water tube boilers that develop an average of 4800 H. P., 24 hours per day the year round.

The water supply used for boiler feed purposes is derived from Lake Erie, and besides having variable amounts of sludge and mud forming matter, contains an average of eight grains of hardness per gallon.

Due to the steady demand for continuous service from these boilers, which are operated day and night without letup, it is absolutely essential that they be free from scale, sludge and mud, as an interruption in service to replace or clean boiler tubes would be very costly.

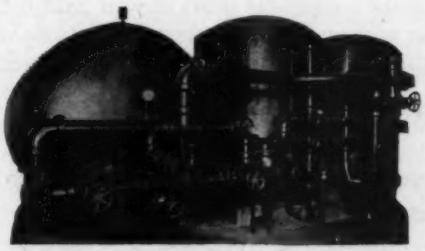
With this in mind a Permutit Zeolite water softening system was installed in September, 1920, when the plant was built. It delivers 230,000 gallons of absolutely clean, zero soft water per day, and during the two years it has been in service it has completely prevented the formation of scale, sludge and mud in the boilers or their connections.

A letter from the vice-president of the corporation states in part:

> ". . . recently we opened a boiler after nine months' continuous service and found no scale of any character on the tubes. . . ."
> ". . . we have not as yet replaced a tube after one and one-half years of operation."

In this large boiler plant, operating at heavy loads day and night, there are no cleaning gangs employed, no boiler shut-downs, no tube replacements—and there have been none since the plant was built in 1920.

How about YOUR boiler plant? Let us solve your problems, too. Write for our valuable booklet today.



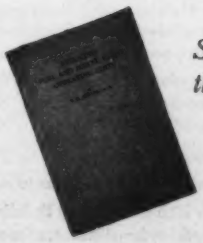
Photograph of Permutit water softening plant described above. Note small size and simplicity of the installation

The Permutit Company
440 Fourth Ave. New York

Zeolite Water Softener Patent Sustained

The Federal Court at Buffalo (Hazel, J.) on June 15th, 1921, handed down a decision sustaining our broad patent covering Zeolite Water Softeners which has been affirmed by the Court of Appeals. According to this decision all Zeolite Water Softening Apparatus on the market not made by us is an infringement of this patent.

No need to borrow trouble — buy Permutit—it is the best anyway.



Send for this free booklet

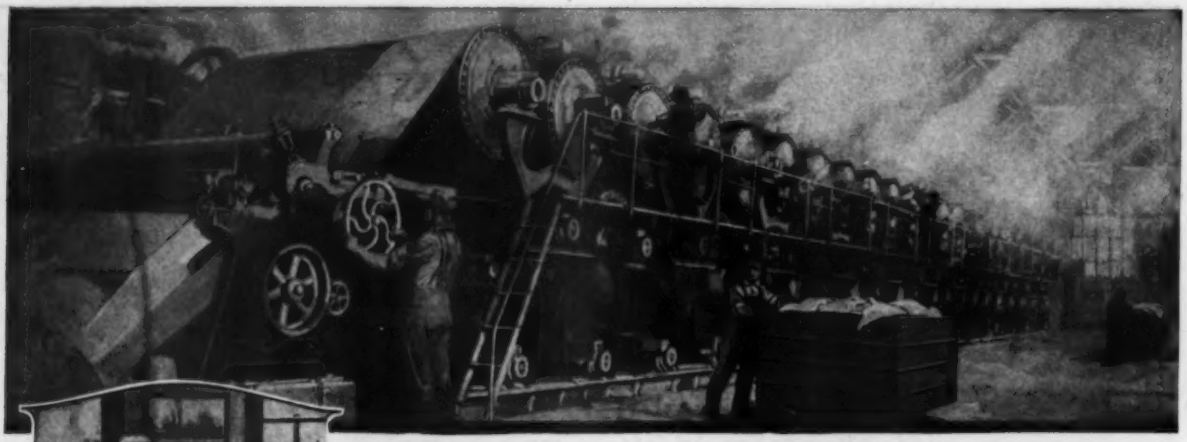
The Permutit Company
440 Fourth Ave.
New York

Please send me your free booklet, "Reducing Fuel and Boiler Plant Operating Costs."

Name _____

Address _____

Company _____



Put your vapor absorption problems before this board of specialists

FOR more than fifteen years, Arex engineers, specialists in industrial ventilation, have been freeing manufacturing properties of profit destroying conditions. Their system of siphonage ventilation, which obviates the use of power equipment with its large first cost and continual operating attention and expense, is known and praised in every industry.

For the paper mill, huge savings have been effected particularly in the machine rooms where excess water vapor, condensing on the roof and superstructure of the building, drips down to cause spots, and tearing of the new paper. The vapor is rapidly removed before condensation occurs, not only decreasing production losses, but preventing decay of the roof and superstructure.

Arex engineers will make a complete study of your machine rooms or any other part of your mill, and submit recommendations without cost or obligation. Use the specification blank below and attach rough sketch or blue print of the building. Address Arex Company, Engineering Division, 1578 Conway Building, Chicago.

Some Typical Arex Installations in Paper and Pulp Mills

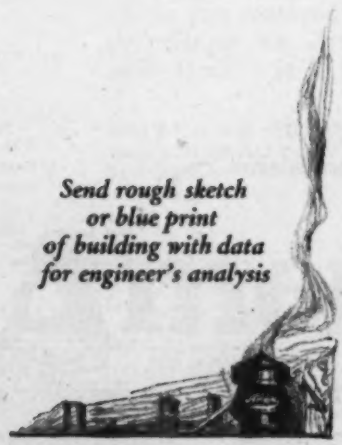
Northwest Paper Company
Whiting Plover Paper Company
Gilbert Paper Company
The Ohio Paper Company
Flambeau Paper Company
John Strange Paper Company
Lakeside Paper Company
Appleton Coated Paper Company
Harding Paper Company
B. D. Rising Paper Company
Aetna Paper Company
Chemical Paper Mfg. Company
Certainteed Products Company
Pilkington Bros.

AREX COMPANY

J. C. Kernchen, Pres.

INDUSTRIAL VENTILATING ENGINEERS

Send rough sketch or blue print of building with data for engineer's analysis



Arex Ventilation Engineering Survey **SPECIFICATION BLANK**

We desire to receive *Gratis* an engineer's analysis of the following building: ..... *State character of work or business building is used for*

We are troubled with: Fumes☐ Smoke☐ Foul Air☐ Heat☐ Condensation☐ Steam☐

Dimensions of Building: Width.....Ft. Length.....Ft. Ceiling Height.....Ft.

Construction of Building: State whether Brick ☐ Concrete ☐ Frame ☐ Stucco ☐

Type of Roof: State whether Flat ☐ Slant ☐ Gable ☐ Sawtooth ☐ Monitor ☐

Pitch of Roof..... State how many..... inches to the foot .....

Location of Floor or Room to be ventilated.....

How high do adjoining Buildings extend over your Roof?.....

How many feet distant are the surrounding Buildings, or is your Building entirely unsurrounded? .....

....
Firm Name Name of Individual Title of Individual

....
Street Address City State

EDITORIALS

A Clean Sheet

OF all men, those engaged in the manufacture of paper should appreciate the new year's demand—"A Clean Sheet."

Not only at the first but every day of the year, they should endeavor to make a clean sheet of paper. To do so consistently is one of the "tricks of the trade." On the other hand the ability, the will power and the desire to start with a clean sheet in the book of life and keep it free of smudge throughout an entire year is a "trick of the trade" wherein all men are made.

When the year is new, it seems fitting that we should look to our ideals. It is the beginning of a new era in our lives. It is the time of the year when those who are mastered by their wills and not their appetites should splash off the year's accumulation of grime, brush off the fatigue of twelve months' labor, square their shoulders, adjust their compass and start with a firm step toward their ideal—toward the goal of their purpose for living.

Last week THE PAPER INDUSTRY started with a clean sheet for 1923. We do not care to keep our sheet clear of all marks. We want that it should bear the record of work well done, goals attained, new goals set and then at the end of the year when it is covered with 1924's sheet, we want that it shall add to rather than subtract from the record of Universal Progress.

This coming year we want to live like men—regular men.

—We take off our hats to 1922 and our coat to 1923.

—We are going to put a little more confidence in our fellow beings; meanwhile fit ourselves to be more worthy of their trust.

Let all of us put our complete energy into an effort to make the pulp and paper industry the world's greatest industry; and our best into making it the cleanest industry.

This magazine will endeavor to use well the clean sheet that is now before us. And the first use of it bears our sincere wish that 1923 will be a prosperous one for you. May miles of clean sheets be the result of your efforts.

An Appalling Waste

YOU will find in this issue of THE PAPER INDUSTRY a number of articles dealing with the subject of waste. We feel that this is one of the most vital subjects which is today being discussed by paper mill men and we want to do what we can to overcome this drawback to the industry.

Waste in the paper and pulp industries is by no means confined to actual manufacturing activities. Due to the fact that paper in some form or another is almost constantly in contact with a vast majority of the civilized and semi-civilized population of the world we find that waste in the industry is a fault of the masses. A statement emanating from the American Paper and Pulp Association is to the effect that these masses waste approximately Fifty Million Dollars' worth of used paper yearly.

Such waste seems almost inexcusable as well as an industrial tragedy.

In terms of forest area, these two million tons of wasted paper are the equivalent of the pulp from 250,000 acres. What an appalling waste! A waste that civilization and the paper industry can ill afford at this time of rapidly failing forests. Much effort and money are spent to prevent loss by forest fires; but a greater waste is in our midst and we scarcely notice it.

The American Paper and Pulp Association is to be commended in its efforts to arouse the public to this industrial crime and to induce it to join in a movement to conserve. Not only is the Association to be commended in this work, but it should be given the support of every man involved in the pulp and paper industry.

February Issue a Safety Number

LAST month we referred to a Safety Code which was to have been published in this current issue of THE PAPER INDUSTRY. Since making that announcement there has been called to our attention the advisability of making Safety the keynote of our February issue. We are therefore holding this Safety Code to be used as a lead article in this special Safety Number.

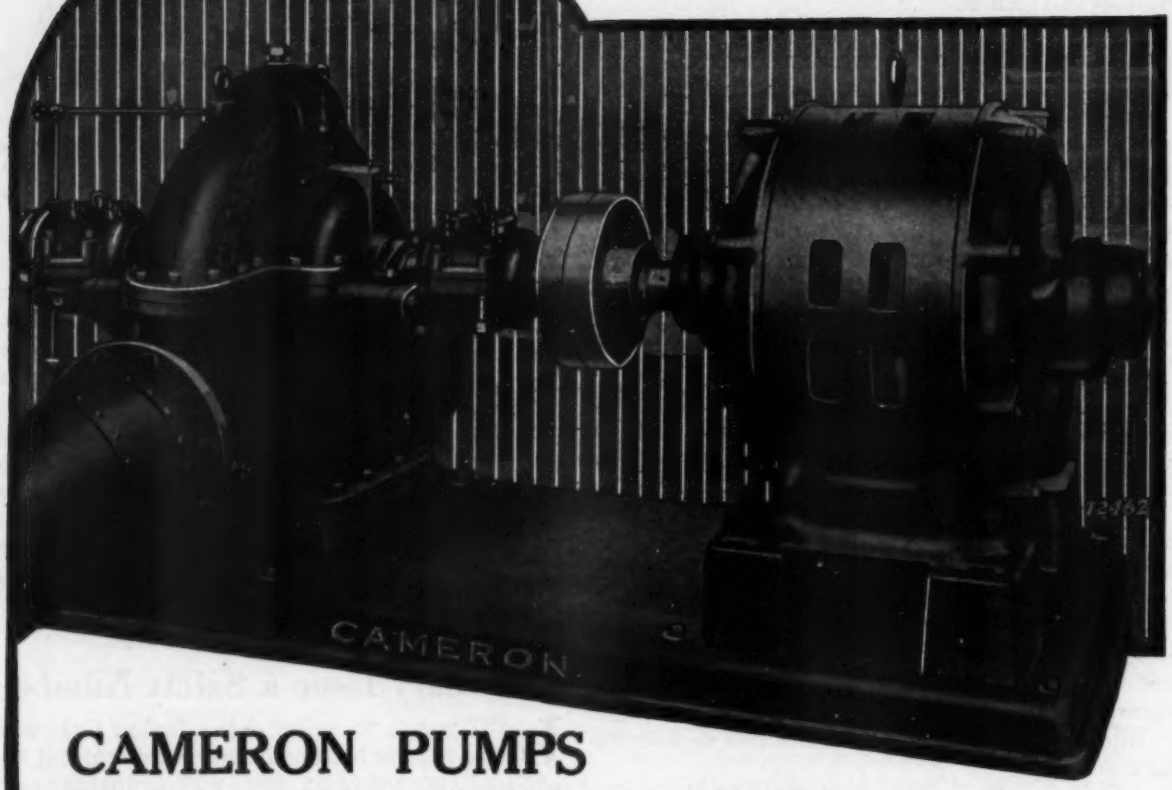
We might also mention that a meeting of the Code Committee, Western Section, of the National Safety Council was held in Milwaukee, December 20. The Code was approved by this section with but few changes. The revised code will be published in full next month.

Appreciation

DURING the holiday season we received many beautiful expressions of Christmas cheer and good wishes. If the purpose of these greetings was to gladden the hearts of the recipients they have most certainly achieved their lofty purpose. We wish at this time, therefore, to express our heartfelt appreciation for each one of these greetings.

We also want to say "thank you" to those who remembered us with calendars for 1923.

CAMERON PUMPS



CAMERON PUMPS
For the Pulp and Paper Industry

High operating efficiency, dependable service, and low upkeep of Cameron Centrifugal Pumps have led to their adoption by practically every industry.

For the Pulp and Paper Mills the open impeller pump—Class "ODV"—has been designed to meet the particular conditions encountered in this industry. This pump has such features as—

Shrouded open impeller of double suction type.
Horizontally split casings having suction and discharge connections in lower half.
Self-aligning bearings—horizontally split. Removable shaft sleeves.

The Class "ODV" Pump can be operated at higher speeds and with better efficiencies than have heretofore been attainable with a pump handling viscous fluids.

SIXTY YEARS OF EXPERIENCE IN PUMP BUILDING IS BACK OF EVERY CAMERON PUMP

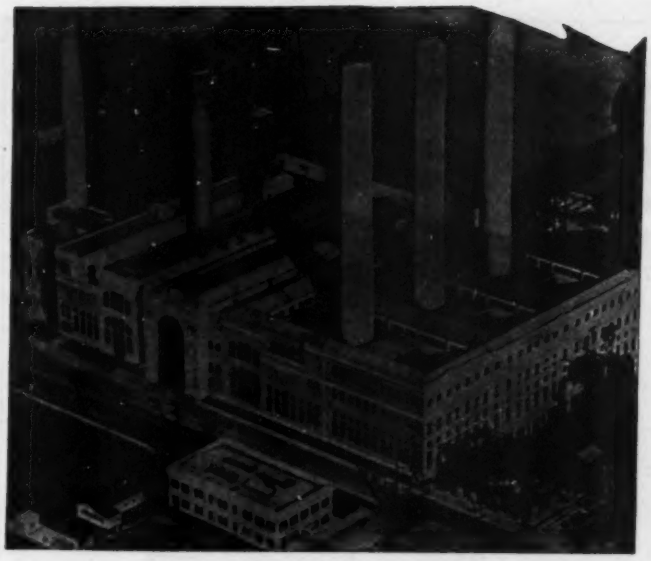
Send for Bulletin 7075 *Our Engineers are at your service*

INGERSOLL-RAND COMPANY, 11 Broadway, New York

Offices Everywhere 168-W

Ingersoll-Rand

A. S. Cameron Steam Pump Works



A typical Foster service record

The Westport Station of the Consolidated Gas, Electric Light & Power Company at Baltimore, Md., made its first Foster Superheater installation in 1912 when 2944 boiler horsepower was equipped.

The saving in fuel and improvement in plant operation effected by this initial installation were so marked that in the following year 6282 boiler horsepower additional was installed and all boilers installed since that time have been Foster equipped.

Today a total of more than 34,000 horsepower of boilers in this plant are equipped with Foster Superheaters—a growth that speaks eloquently of the continuous records for economy obtained year after year.

Such results are assured in every Foster Superheater installation by the Foster experience of 20 years, the tested excellence of Foster design and construction and the assistance rendered by the Foster Service Department to power plant engineers.

The improvements of engine, turbine and boiler operation that can be obtained through the use of superheat, and the advantages of Foster Superheater construction are fully explained in the Foster Superheater Book. Send for a copy.

Advantages of Foster Superheater Construction

1. Steel for strength, cast iron for durability.
2. Four to six times as much heat-absorption surface as obtained from bare tubes.
3. Reserve heat stored for sudden demands.
4. Steam stays close to the hot tube surface.
5. Great flexibility of design.

"The Superheater with the Extended Surface." Over 10,000 installations.

POWER SPECIALTY COMPANY
111 Broadway, New York

Boston Detroit — Boulder Philadelphia — Kansas City Pittsburgh — Dallas Chicago — London, England San Francisco

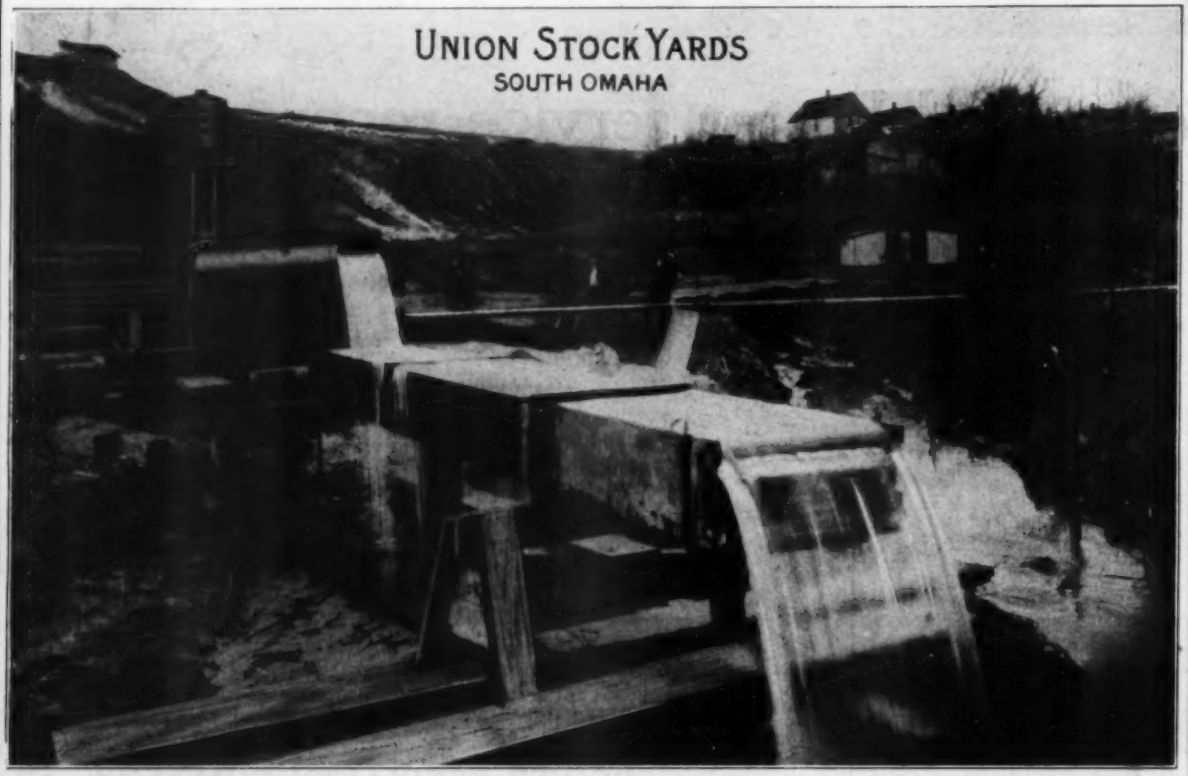
Plants at Danville, N. Y., and Egham, England 48

FOSTER SUPERHEATERS

GREGG

WATER IN ABUNDANCE

You will never be short of water at Your Paper Mill if you install Gregg Propeller Pumps in your tubular wells. You do not need more wells. You need Gregg propeller pumps to develop your present wells to their full capacity and give you greater pumping economy.



Testing Ten Inch Tubular Well for Union Stock Yards Company. One million Gallons of Water per day pumped from this well during a Twenty-four Hour Test. Fourteen Gregg Propeller Pumps have been installed in this plant.

We have our deep well pumps in successful operation at the Kalamazoo Vegetable Parchment Co., the Bryant Paper Co. and the Allied Paper Mills, Kalamazoo, the Alton Box Board & Paper Co., Alton, Ill., and many other prominent plants. If you are short of water at your plant we are prepared to help you out. Send us your well data, we will do the rest.

GREGG PUMP COMPANY

1417-1425 Fulford Avenue **Kalamazoo, Michigan**

SKF

Ball Bearings on Return Felt Drums

Longer Life From Felts—Fewer Shut Downs

WHEN plain bearings are used on return felt drums they soon develop wear and often stick and bind under the heavy pull to which they are subjected. As a result the bearings have to be frequently adjusted and replaced and an undue drag is placed on the felt, materially shortening its life.

By supporting the return felt drum on **SKF** marked self-aligning ball bearings mounted in water-tight housings, bearing adjustments and replacements are unnecessary and longer life is obtained from felts. This is due to the fact that this type of bearing operates practically frictionless even under conditions of misalignment.

Similar advantages accompany the application of self-aligning ball bearings to other rolls on paper machinery of all kinds. Let our engineers consult with you on the problem of bringing these economies of production to your mill.

THE SKAYEF BALL BEARING COMPANY

Supervised by **SKF** INDUSTRIES, INC., 165 Broadway, New York City

SR7

Normal View *Deflected View*

BALL BEARINGS
The Highest Expression of the Bearing Principle

Jones

New Speed Reducer Catalog Number 26

NOW READY FOR DISTRIBUTION

An entirely new edition. The information contained therein is of exceptional value to *Consulting Engineers, Superintendents, Chief Engineers, Master Mechanics;* in fact, to anyone who specifies mechanical drives for factories, mills, mines or plants.

It is our aim to place all copies of this edition in the hands of those who are vitally interested in Speed Reduction Problems. We ask that requests for copies be made on business stationery giving name and title of individual to facilitate prompt delivery.

In preparing this new and most complete treatise on Speed Reduction Drives, our intention was to make it the standard work of its kind and we take particular pride in presenting it to you.

You will find embodied therein, technical and practical information, complete descriptive matter and illustrations of typical drives.

The installation section presents pictorially Reducer Drives in many large industrial plants.

Dimensions, weights and horse power ratings for complete Speed Reduction Sets are shown.

W. A. Jones Foundry & Machine Company

Main Office and Works

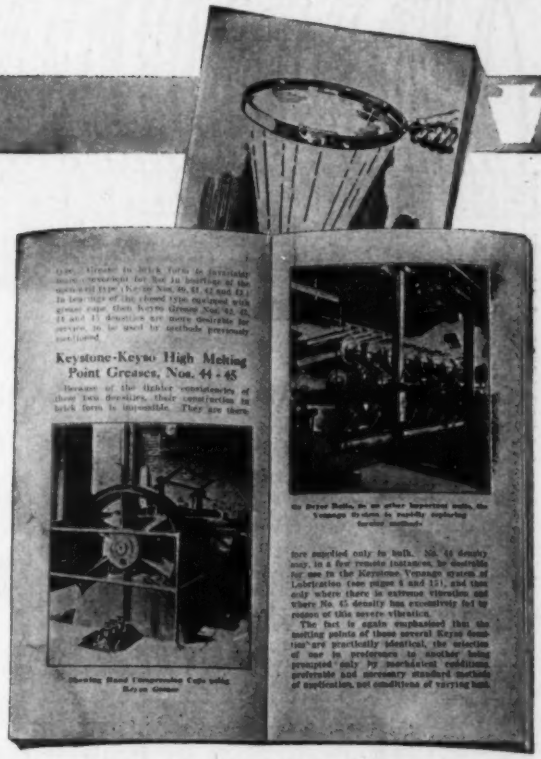
4436 West Roosevelt Road • Chicago

Branch Sales and Engineering Offices in Principal Cities

Efficient Lubrication Under Most Unfavorable Conditions

REALIZING that lubricant dependability is one of the most essential features in efficiency and safety in every industry, this company has striven to meet the demand, wherever it arises, for a lubricant which must perform efficiently under the most unfavorable working conditions.

By combining high heat resisting properties with high lubricating and friction reducing value, we have in the Keystone-Keyso Formula a group of greases which represents a wonderful achievement in grease-making. This formula has proven in actual operation under severest tests that it meets one of the most difficult lubricating problems better than it was ever met before.



Send for this Booklet on Keystone-Keyso High Melting Point Greases

Keystone-Keyso
High Melting Point Grease
was developed for machinery operating under high heat conditions. It combines all the necessary heat-resisting properties with high lubricating value and efficiency.

THE KEYSTONE LUBRICATING CO.

New York
Boston
Pittsburgh
Chicago
Detroit
Denver
St. Louis

Executive Office and Works:
Philadelphia, Pa.
Established 1884

San Francisco
Minneapolis
Montgomery, W. Va.
Kansas City
Memphis
Omaha
Tulsa, Okla.

Agencies in Principal Countries Throughout the World

KEYSO
TRADE MARK
REG. U.S. PAT. OFF.
GREASE

We were PIONEERS in making
OSCILLATING, NON-SCORING
FOURDRINIER WIRES

This is one reason why
"Appleton Wires Are Good Wires"

Fourdrinier Wires
Cylinder Wires
Washer Wires
Of brass or bronze

APPLETON WIRE WORKS
Appleton, Wis., U. S. A.

Not only board with a *better finish* but board with a *higher test*—

This is the result
achieved by

KENWOOD ONE SIDED
BOTTOM BOARD FELTS

In combination with Kenwood One Sided Superfine Top Felts and Kenwood One Sided Fine and Super Press Felts the result is not only smoother finish and higher test, but **greater production** and **less trouble.**

These felts were the first successful application of this type of weave to the large, high-speed board machine. Today they are unexcelled:

—in the finish they produce
—in daily production during life of felt
—in length of life
—in freedom from curling edges, uneven width, stretching and blowing.

All these advantages are offered without any advance in price. Only where finer weaves and finer yarns are necessary, either in One Sided or Plain weave felts, are extra prices charged.

F. C. HUYCK & SONS
KENWOOD MILLS, ALBANY, N. Y.
KENWOOD MILLS LTD., ARNPRIOR, ONTARIO, CANADA

MATHIESON System

Bleach Liquors from Liquid Chlorine

YOUR present facilities are readily adaptable to the use of the Mathieson System.

Developed by Mathieson engineers, this system is a revolutionary improvement over the old Chloride of Lime method of preparing bleach liquors.

A few of its advantages are:

Solutions uniform in strength and of any desired concentration.

Prevents formation of chlorates and over-chlorination.

Requires no additional equipment outlay.

Eliminates complicated valves and control apparatus.

Simplifies operation.

Is more economical.

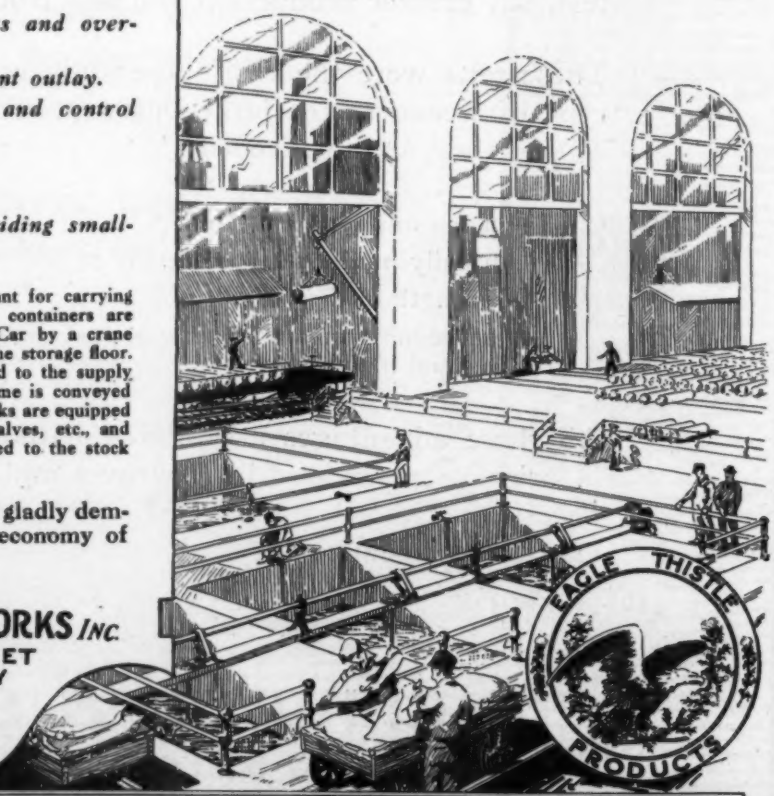
Increases safety factor by providing small-unit Chlorine storage.

The illustration represents an ideal plant for carrying out this system. The one-ton Chlorine containers are unloaded from our Multiple Unit Tank Car by a crane and transferred on an industrial truck to the storage floor. The containers, as required, are connected to the supply pipes leading to the mixing tanks; the Lime is conveyed by means of an industrial truck. These tanks are equipped with the usual pumps, expansion coils, valves, etc., and the liquor, when settled, can be transferred to the stock tanks by the circulating pumps.

Our Technical Department will gladly demonstrate the greater safety and economy of this system.

We also manufacture for use in the Paper Industry:

Caustic Soda, 78%, 76%, 74%
Bleaching Powder
Soda Ash, 58%, Light and Dense



MATHIESON ALKALI WORKS INC.
25 WEST 43rd STREET
NEW YORK CITY
PHILADELPHIA
··CHICAGO··
PROVIDENCE
CHARLOTTE.

Deal Direct with the Manufacturer

CHEMICAL STONEWARE

Material for the Construction of Towers, Tanks, Digesters, Floors, Etc.

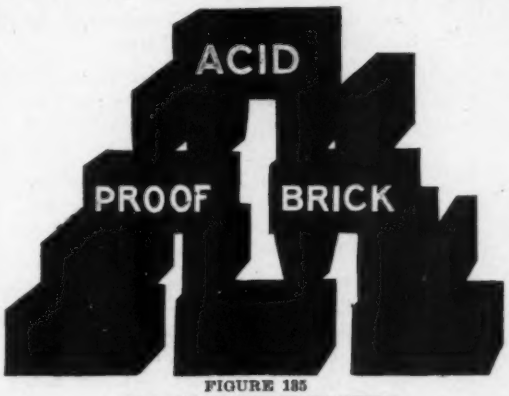


FIGURE 135
ACID PROOF VITRIFIED BRICK

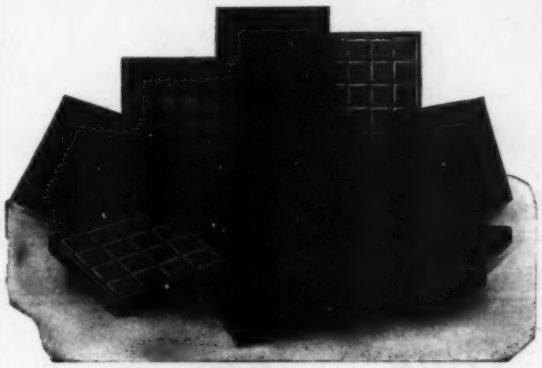


FIGURE 139
ACID PROOF TILE OR BRICK

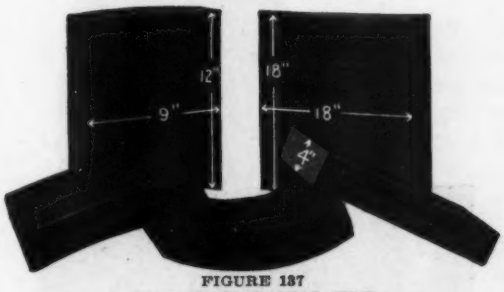


FIGURE 137
ACID PROOF RADIAL TILE

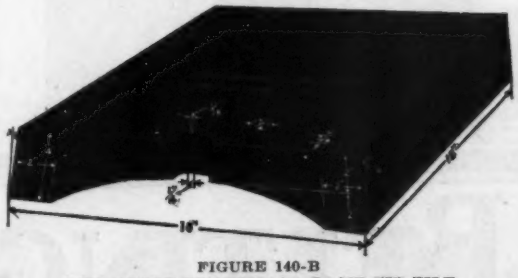


FIGURE 140-B
ACID PROOF DRAINER OR BLOW PIT TILE

FOR 18 YEARS AT

Our Ware Is Not Dependent Upon a Glaze, Enamel or Veneer. IT IS THE BODY ITSELF

Acid Proof Chemical Stoneware Brick Figure 135 for the construction and packing or filling of Glover and Gay-Lussac Towers, also construction of Tanks, Digesters, Vats, Pickling Tanks, etc. Standard size 8"x4"x2¼". Carried in stock, also No. 1 and No. 2 standard Arch. "Splits," "Wedge," "Soap," "Key," "Skew," "Jam," "Neck," "Feather Edge," "Checker," and other designs made up as required. These brick are acid proof throughout the entire body, dense and impervious, and made of the same materials and fired under the same conditions as our other products. We have made them for 18 years and have sold many million for all kinds of chemical purposes and to most of the large acid and chemical manufacturers. Brick is laid with our acid proof cement as described in this catalogue under "Acid Proof Cement and Construction Data."

Our ware is not fancy—*But it is guaranteed*

Acid Proof Tile or Brick Figure 139 as shown are used for lining flat surfaces in towers, tanks, etc., of a square or oblong design, and the back of the tile are ribbed to make a better holding surface to the backing. Made in most any size or design, with plain or tongue-groove edges, and in thickness as required. State size and design wanted, also number required. Not carried in stock but made up as needed. Made in the body best suited for your special needs. The tile is acid proof throughout the entire body. Joints are cemented with our acid proof cement as described in this catalogue under "Acid Proof Cement and Construction Data."

Write for a Copy of Our Fully Illustrated Catalog

Acid Proof Chemical Stoneware Radial Tile Figure 137 are made in any radius required, and of most any size and thickness to meet your requirements, for lining tanks, towers, digesters, vats, etc. Made with plain edges or with tongue and groove, or to your own design of edge. Made of the proper body to meet your requirements. Joints are cemented with our acid proof cement as described in this catalogue under "Acid Proof Cement and Construction Data." Not carried in stock but made up as wanted. State inside radius of tower or tank and size and design of tile wanted.

Our ware is not the cheapest—*But it must be right*

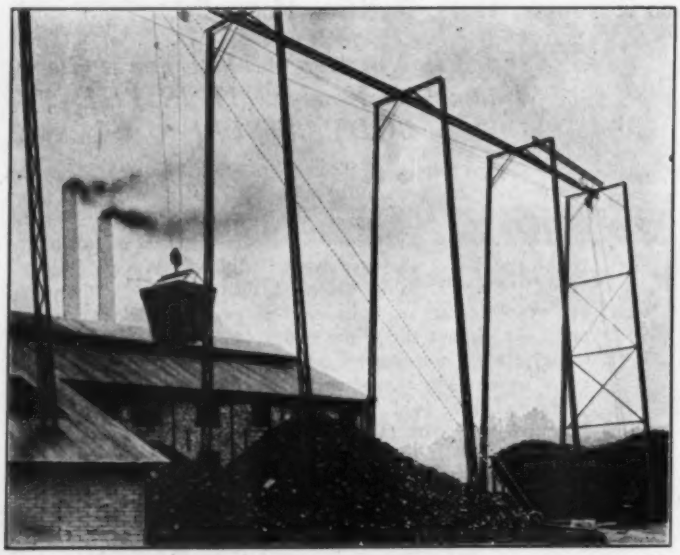
Acid Proof Drainer or Blow Pit Tile Figure 140-B is designed primarily for use as a false bottom in blow pits in pulp mills, but finds many other uses where a perforated false bottom is required. The holes can be made of any diameter and set as close together as wanted, and of either the straight or taper type (self cleaning non-clogging). The arch construction gives this type of perforated tile greater strength than the flat type shown under No. 138. Advise your requirements as to design, size and number and bore and spacing of holes.

MAURICE A. KNIGHT

Office and Factory
Kelly Avenue

Akron, Ohio

More Coal for Less Money



The price you pay for coal represents only a portion of its actual cost. The items that make up the difference are the handling and demurrage charges.

You can put a stop to these losses by installing a **Godfrey Conveyor**—that will cost you no more than the price of a good truck.

With this system, **one man** unloads and stores a carload of coal in an hour and a half, at an average power and labor cost of from five to seven cents a ton.

There is a type of **Godfrey Conveyor** to serve the requirements of every power plant, both large and small. Send us a rough pencil sketch showing location of siding in relation to your bins, boiler room or storage pile, and our engineering staff will submit a careful analysis of your problem, without cost or obligation.

Ask for Catalog A-1

GODFREY CONVEYOR COMPANY

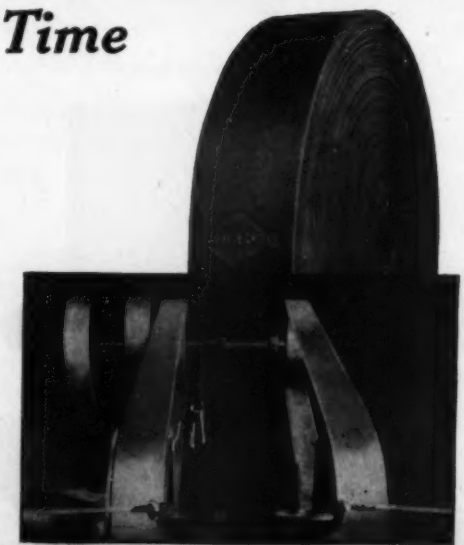
ELKHART, INDIANA, U. S. A.

Cutting Down "Lay-Off" Time

Broken belts pile up overhead charges on non-productive time. Dependable belting is essential to the highest mill operating efficiency.

The Republic Double Cross especially designed and built for hard paper mill work, is a dependable belt. Constructed of the highest grade duck, frictioned with damp-proof finest quality rubber, it combines strength and smooth running qualities to the highest degree.

Cut down your "lay-off" time. Specify Republic Belting. You can rely on it for long, hard service—**always.**



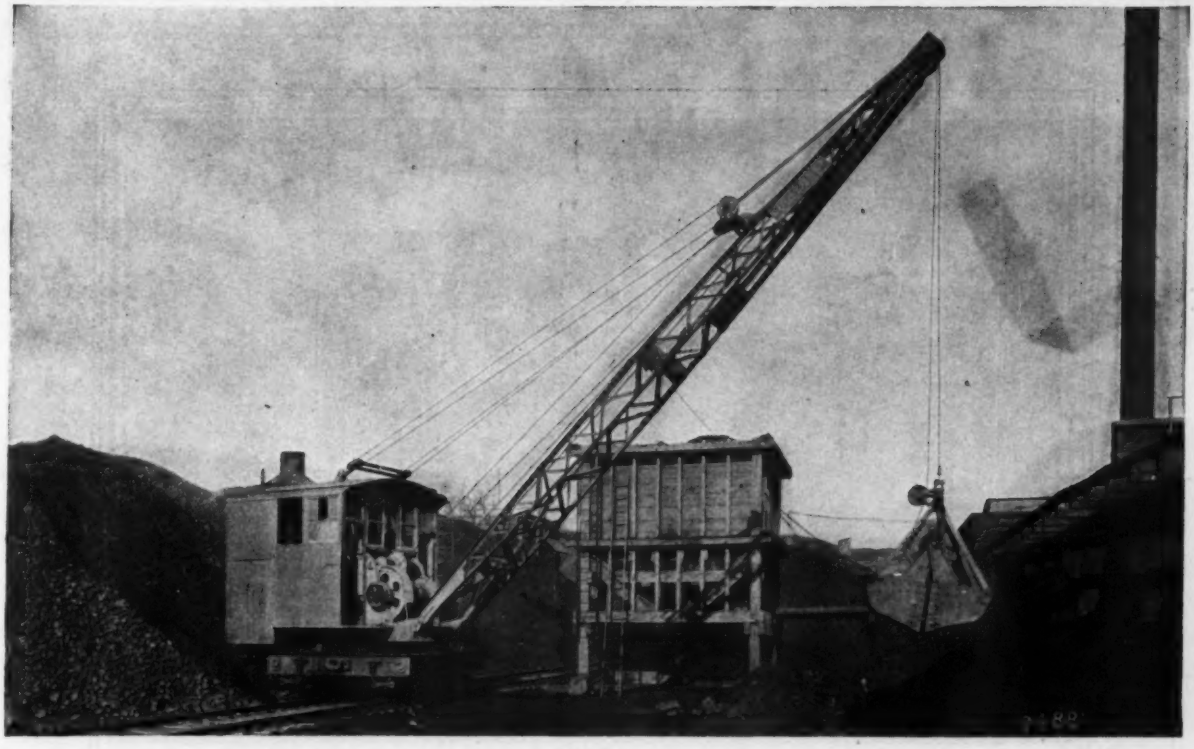
Let Us Serve You

THE REPUBLIC RUBBER COMPANY

Youngstown, Ohio

New York Chicago Philadelphia Minneapolis
Kansas City Cincinnati Atlanta Pittsburgh

REPUBLIC BELTING



HOW CAN I STORE COAL ECONOMICALLY?

THE recent coal shortage brought forth this question many times. We cannot all store coal and be prepared for the next emergency, but if your conditions permit, you should build an adequate reserve coal storage plant; build it on the Link-Belt System of coal storage.

Our most satisfied customers during the past year were those for whom we designed and built coal storage plants—some were very l a r g e plants, many were small. But they all paid large returns.

A Link-Belt coal storage plant is not an expensive proposition. You will be surprised, as have many of our present clients, at the comparative small outlay in dollars that will secure a plant to safeguard y o u r works against a fuel shortage.

Let us tell you whether or not you can store c o a l economically. Link-Belt engineers have studied c o a l storage from every angle. The benefit of their experience is y o u r s for the asking. Writing us entails no obligation. We have aided many in the solution of their coal storage problem — we might be able to help you.

LINK-BELT COMPANY

1088

PHILADELPHIA CHICAGO INDIANAPOLIS

New York . . . Woolworth Bldg. Wilkes-Barre . 24 Nat'l Bank Bldg. Seattle . . . . . 620 First Ave., S. Louisville, Ky., Frederick Wehle Starks Bldg.
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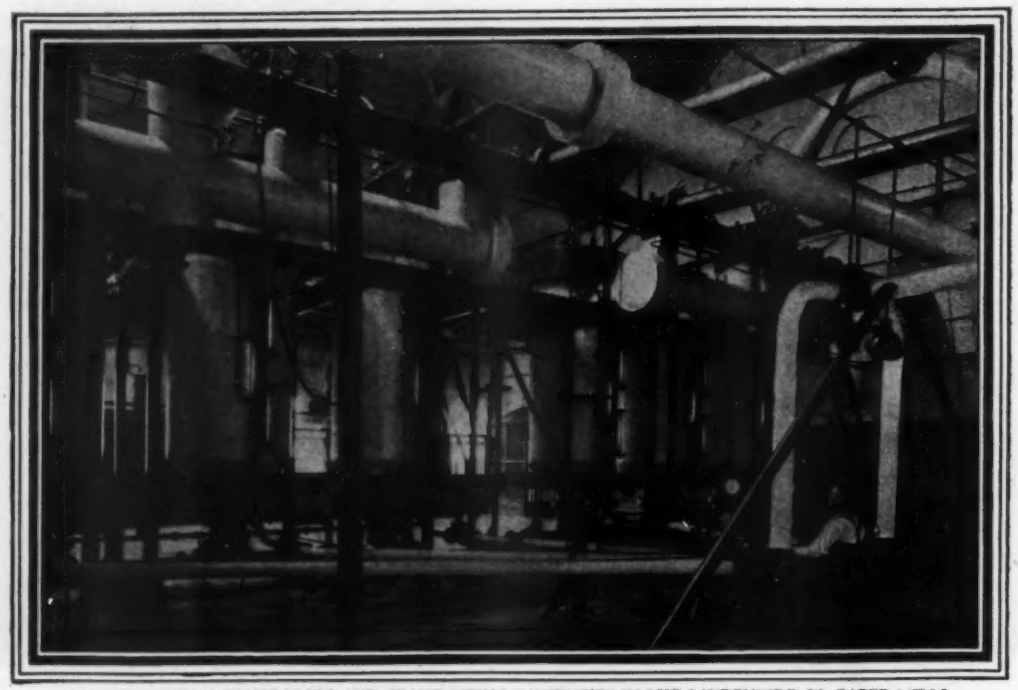
Canadian Link-Belt Co., Ltd., Toronto and Montreal H.W. CALDWELL & SON CO., CHICAGO NEW YORK, Woolworth Bldg.

LINK-BELT



ELECTRIC STEAM GENERATORS AND CRANE PIPING EQUIPMENT IN THE LAURENTIDE CO. PAPER MILLS

MEETING EVERY PIPING REQUIREMENT

The most advanced developments in the generation and use of steam are ably supported, in the piping equipment used, by Crane valves and fittings and Crane pipe bends, headers and steam specialties. The wide variety in Crane standardized units provides valves, fittings and specialties for all needs. Special equipment, including pipe bends and steam headers for individual applications, can be supplied by Crane Co. in any required size for every pipe-line use. Crane branch houses are conveniently located at strategic shipping points to insure prompt deliveries to any part of the country.

CRANE

GENERAL OFFICES: CRANE BUILDING, 836 S. MICHIGAN AVE., CHICAGO

Branches and Sales Offices in One Hundred and Thirty-five Cities

National Exhibit Rooms: Chicago, New York, Atlantic City

Works: Chicago and Bridgeport

Crane 75 Low Pressure Globe Valve

Stamina

INSTALLED on the shifting bank of a creek, exposed to the elements and half buried in sand and rocks, this Terry Turbo Pump Unit has given perfect service for about five years. By shifting of the bank this unit has slid 15 ft. or more from the position in which it was originally installed, yet the superintendent of the Sand Company which uses it cheerfully advises us that "it has given perfect service and we expect to use it ten years more."

The stamina of a unit which permits it to operate satisfactorily under such severe conditions must make for even more satisfactory performance under good power plant conditions.

Write for Bulletin 25 for the many other reasons why you should

Specify

T-755

THE TERRY TURBINE

Offices in Principal Cities in U.S.A. also in Important Industrial Foreign Countries

The Terry Steam Turbine Co.
Terry Sq. Hartford, Conn. U.S.A.

FOURDRINIER WIRES

Dandy Rolls *Cylinder Molds*

Brass, Copper and Iron Cloth

Bank and Office Railings

WIRE SIGNS

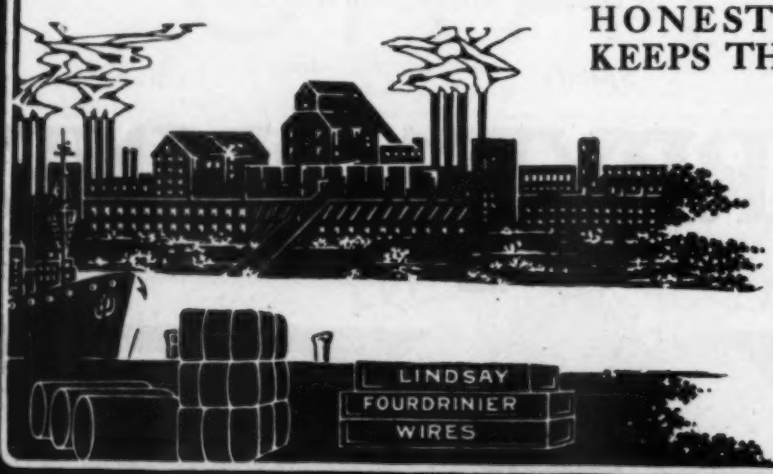
Cheney Bigelow Wire Works

Established 1842 SPRINGFIELD, MASS.

Real Merit Placed

Lindsay Fourdrinier Wires

In Many Mills



HONEST SERVICE KEEPS THEM THERE

They are ready to serve you

The Lindsay Wire Weaving Company

Collinwood Sta., Cleveland, Ohio

"Ask any Papermaker"

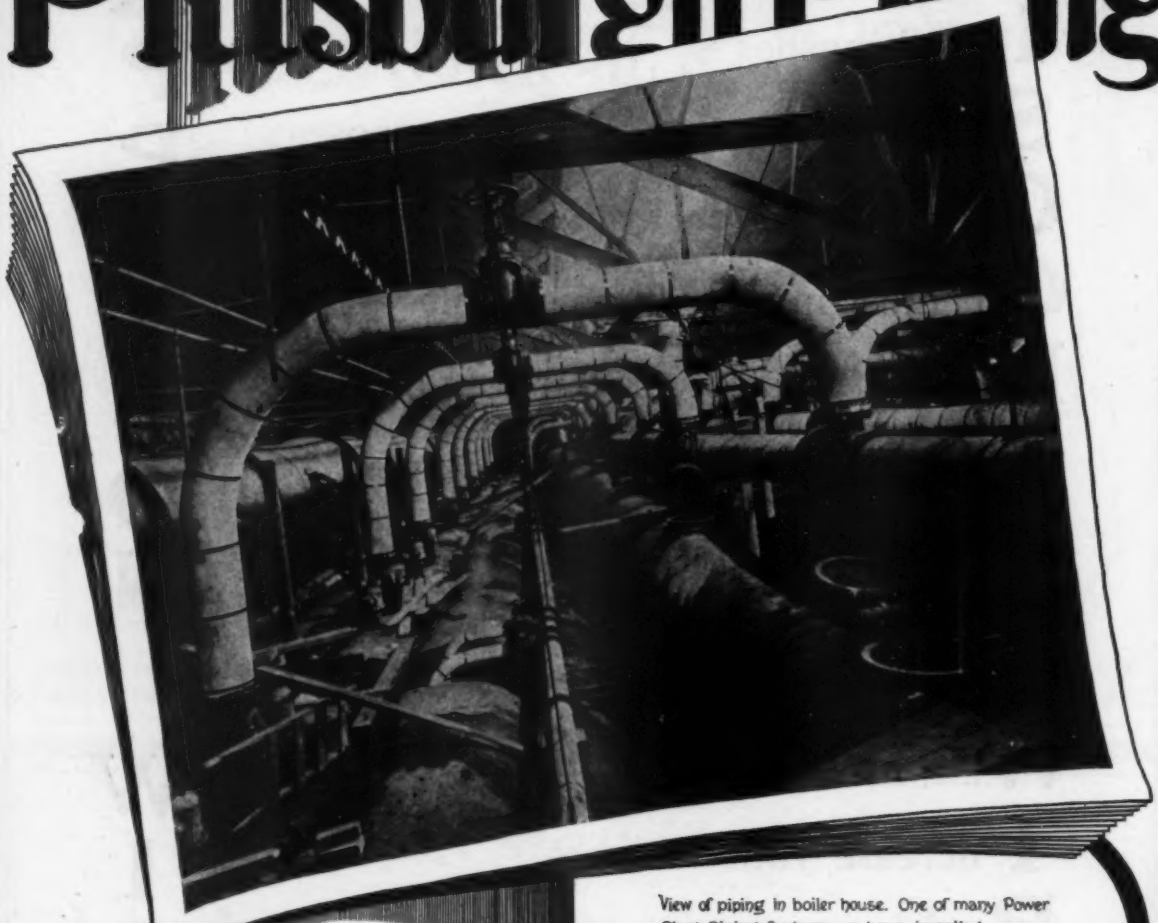
Wisconsin wires
I n all meshes
Suitable for paper making purposes
Carefully woven by experts only
On most modern looms, built
Not for greatest production, but with
Special attention and care given
I n construction of these machines to
Need of "Quality first."

Wisconsin wires
I ncrease your tonnage
Reduce your costs, and
Enlarge your profits.

Wisconsin wires
Of highest quality,
Remarkable life,
Keep their alignment, and have
Seams that neither mark nor break.

APPLETON WISCONSIN

Pittsburgh Piping



View of piping in boiler house. One of many Power Plant Piping Systems we have installed.

KNOWLEDGE, Experience and Complete Organization—welded together for the manufacture and fabrication of Power Plant Piping that stands for Uniformity, Quality and Distinctive Service.

"WHEN YOU THINK OF PIPING THINK OF PITTSBURGH PIPING."

Pittsburgh Piping & Equipment Co

MANUFACTURERS & CONTRACTORS

Specialists in Welded Wrought Steel Headers, Flanged Iron and Steel Fittings, Pipe Bends and Fabricated Piping for Power Plants.

Pittsburgh, Pa.

NEW YORK, 220 BROADWAY. CHICAGO, PEOPLES GAS BUILDING
CLEVELAND, AMERICAN TRUST BUILDING. SAN FRANCISCO, MONADNOCK BUILDING
INDIANAPOLIS, TRACTION TERMINAL BUILDING. BIRMINGHAM, AMERICAN TRUST BUILDING

"Clip" Gate Valves

Fig. 608. Screw Ends, Iron Body Bronze Mounted

An original Lunkenheimer development with a record of more than twenty years of success in service.

The simplicity of the design; the durability and the wide range of sizes and material combinations available peculiarly fits them for standardization in the low pressure lines throughout the plant. The Inside Screw type is recommended for pressures up to 100 pounds, while the Quick-Operating type is good for 50 pounds.

Iron Body Bronze Mounted for handling Steam, Water, Oil, etc., and "All-Iron" for use with Acids, Alkalis, and other fluids which attack bronze alloys.

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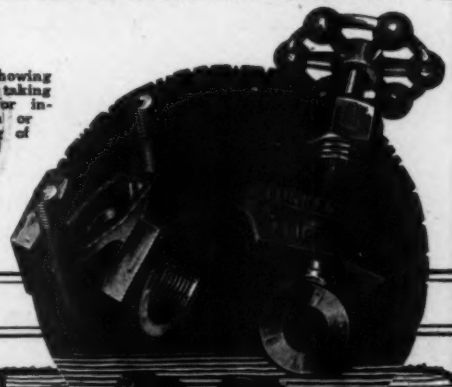
Fig. 639. Quick-operating type, Screw Ends. I. B. B. M.

Fig. 638. Flange Ends, Iron Body Br. Mounted



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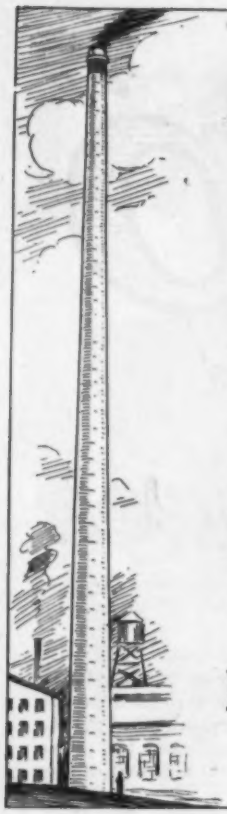

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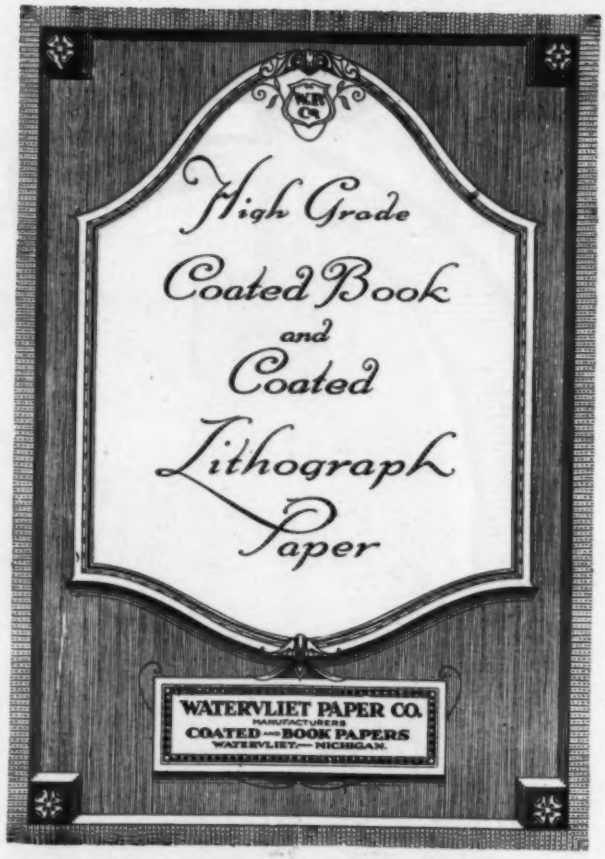

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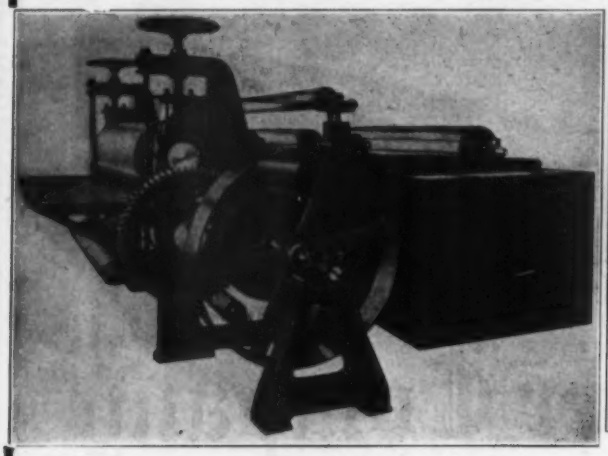

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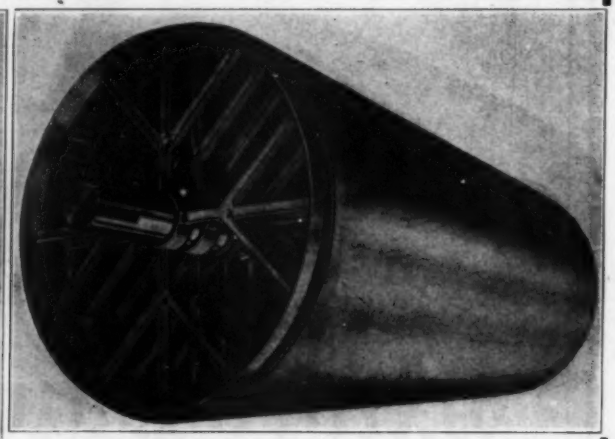

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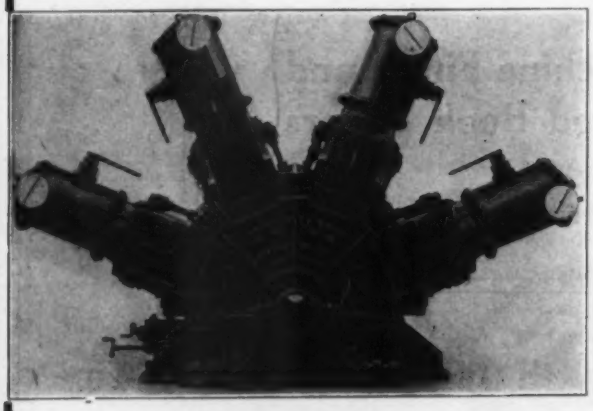

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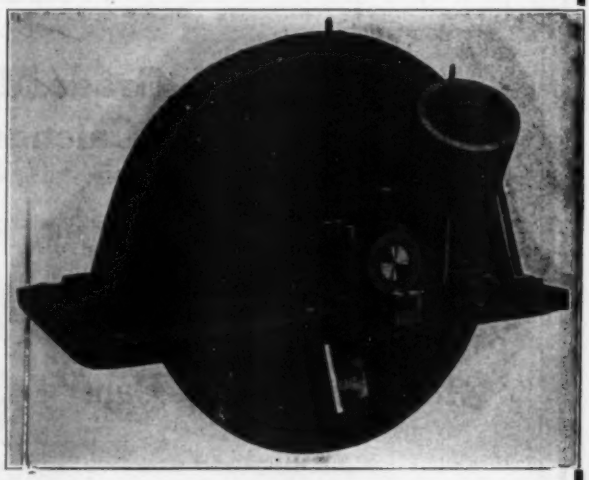

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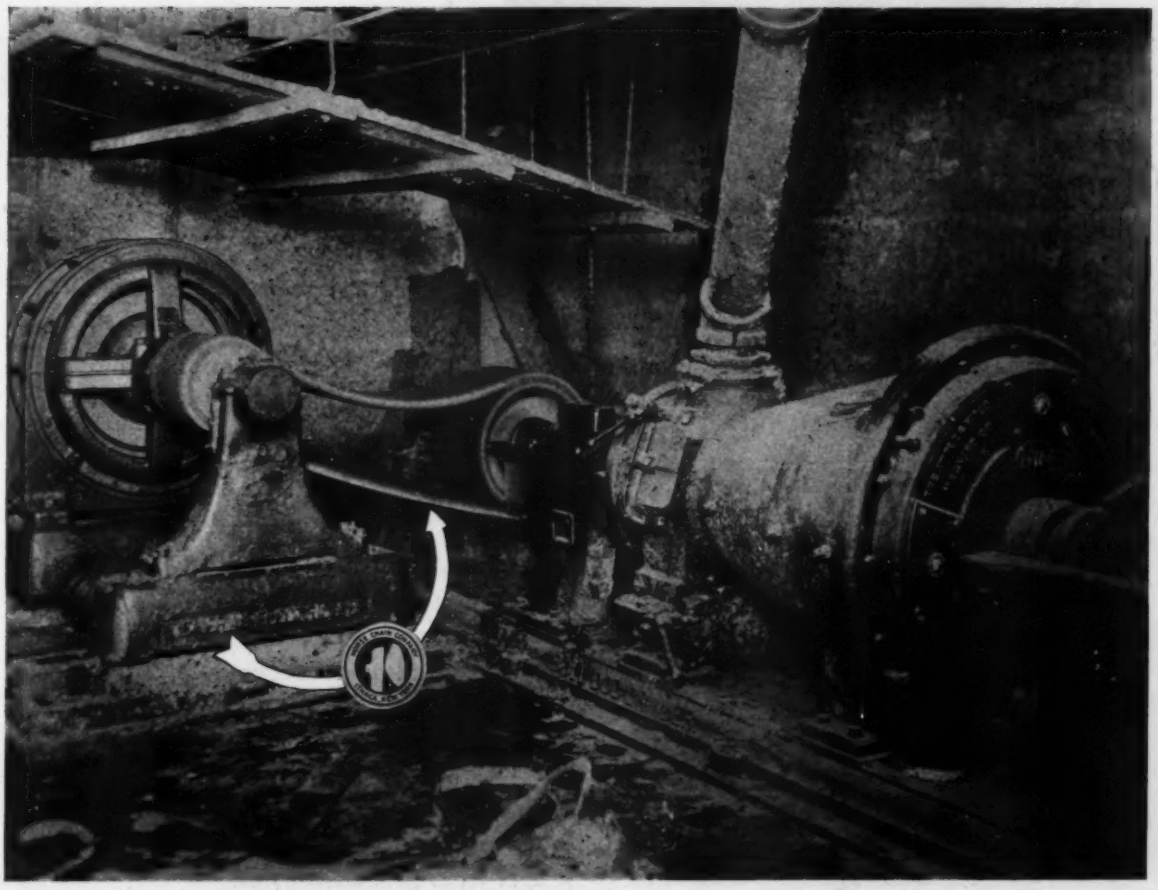

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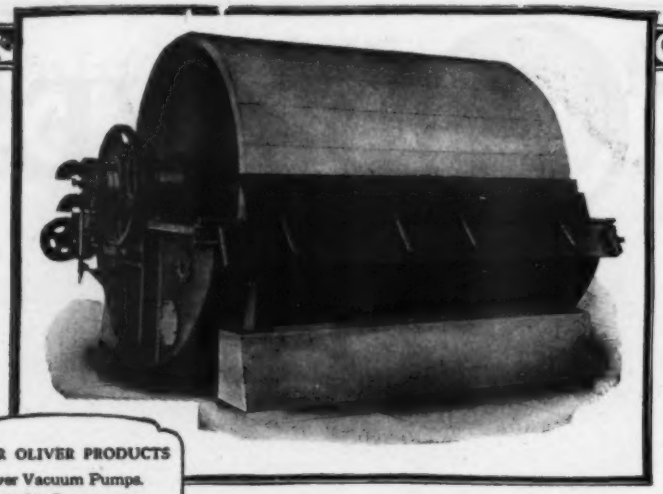

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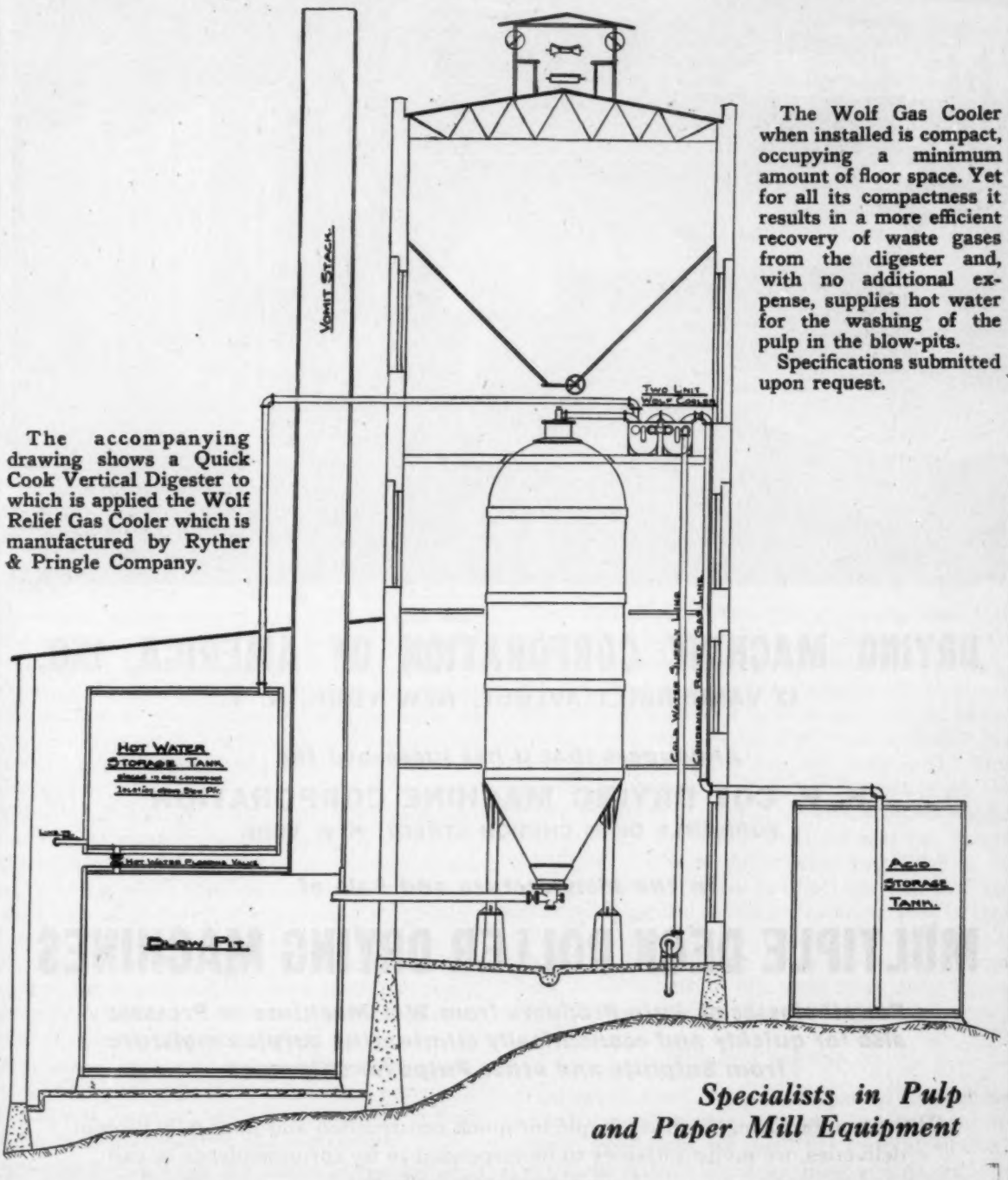
The Wolf Gas Cooler

The accompanying drawing shows a Quick Cook Vertical Digester to which is applied the Wolf Relief Gas Cooler which is manufactured by Ryther & Pringle Company.



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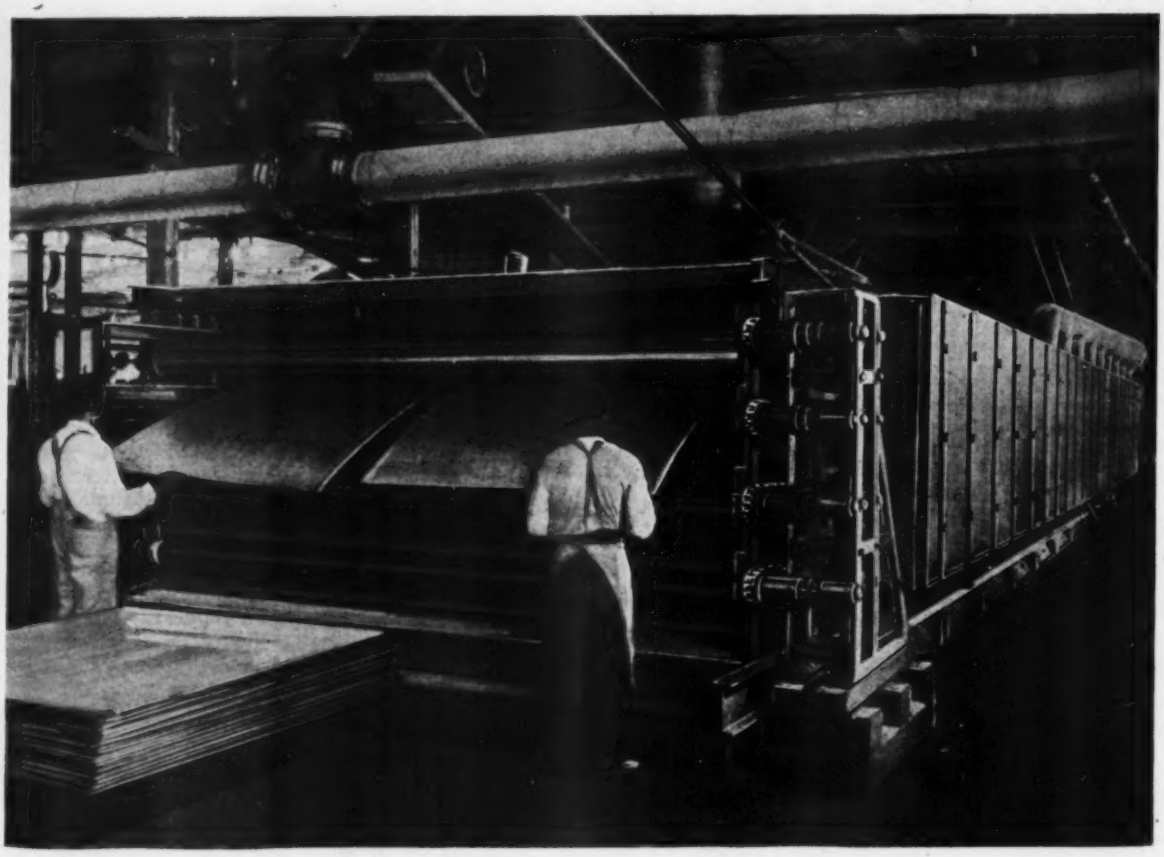

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CATALOGUES AND ESTIMATES ON REQUEST

Waste in the Pulp and Paper Mill

BY JOHN A. KAGERHUBER, M. E.

This installment is the first of a series of articles on waste, prepared by John A. Kagerhuber. They carry through the various departments of the pulp and paper mill, discussing in detail the potential wastes in each. —EDITOR.

The Boiler House

THE country's need for every possible economy in the use of coal during the next few years can hardly be overemphasized.

The first problem is how to make our coal go as far as possible, and the way to go after this problem is, to find out in every boiler house all the places where waste actually takes place and then take immediate steps to prevent the waste.

Preventable Losses in the Boiler House

Air Leakage: One of the largest losses and most common, is the coal waste caused through air leakage which can easily be controlled. Places to look for air leakage are: Cracks in boiler walls and settings; leaks or air spaces between iron door frames and boiler walls; leaks around blow-off piping.

Cold air that leaks in will use up heat until it reaches the temperature of the furnace gas, and, therefor, wastes heat, which could be used to perform useful work. Leakage often amounts to from 50 per cent to 100 per cent and the latter means a waste of at least 20 per cent. Cracks in the boiler walls are not always noticeable, but may be sufficiently large to admit a certain amount of cold air to the furnace to lower the efficiency.

Although air-leakage is one of the most important causes of coal waste it can very easily be remedied.

The application of some sort of insulation in either sheet, paste or block form and of proper thickness, finished with a tight surface, will prevent air-leakage, and also will reduce radiation of the heat from the boiler walls, this should always be done if boiler walls are hot on the outside and loss due to radiation great. Wide or large cracks should be caulked with asbestos cement previous to applying coating.

Open spaces around door frames should be sealed with cement that will adhere to iron and brickwork and that will remain intact when subjected to heat with the result of expansion and contraction.

Defective firebrick settings should be repaired and bricks set up or bonded together with material that will not crumble and which must also resist the strain of expansion and contraction.

Good results are being obtained by coating the interior surface of the furnace with a refractory material.

Leaking Baffle Walls: Unless baffle walls are tight, a percentage of the gases will short circuit, or go directly from the fire to the stack, whereas with a perfectly tight baffle the gases must follow the routine layed out for them and therefore cover the entire heating surface.

Excessive leakage through the first baffle, or the one closest to the fire, can be found by looking through the peepholes just beyond the baffles. Do not make the mistake in putting joints into baffles when repairing or constructing new baffle walls, whether between sections of baffles or around the tubes. The more nearly air-tight the wall the higher boiler efficiency you will obtain.

Radiation of Heat: Wastage of heat caused by radiation from boiler walls, from Drums, tops of boilers, is very largely preventable. Some form of insulating material can be applied to eliminate this loss; and in the case of boiler wall insulation will serve also to eliminate leakage of air through boiler walls and settings.

Preventable Losses from Steam Pipes

Heat Radiation: Steam piping running from boilers to engines and auxiliaries and also hot water lines from heaters and feed pumps, make up a large area of heat radiating surface, and therefore offers plenty opportunities to effect a large saving. From 50 per cent to 70 per cent of heat that would be lost if hot water and steam pipes are left uncovered. This amount can be saved, if proper insulation to the proper thickness is applied. The insulation should cover not only the piping itself but also the flanges and fittings. It is important that right kind of insulation is selected and it is very important that the insulation is applied to proper thickness, that is, that some heat would still be wasted if the insulation is not adequate, insulation should be closely joined either on the length of pipe or fittings, all joints or seams in insulation must be carefully sealed.

Steam Leakage

Leakage of steam due to poorly packed pipe flanges and valve stems is very easy to detect and easy to correct. Most leaks are small, but many small leaks cost a large amount of money, most anyone can look up a handbook and find tables showing loss due to steam leaks.

For packing pipe flanges use as thin a packing as possible. All leaky stems of valves should be re-

packed, this leakage can be entirely done away with by correct packing.

Preventable Losses in the Engine Room

In many cases one finds leaky stuffing box glands, this is prevented by tightening up the bolts and compressing the packing, with the result that the unproductive load of the engine is increased, the same as if you would apply a brake to an automobile, naturally more steam is consumed and consequently a waste of fuel. Of course this leakage must be stopped and the way to prevent it is to give the gland adjustment proper attention, and where packing must be used, the selection of the proper kind is very important, an automatic packing which requires no adjusting is preferable at all times and costs less in the long run, although the initial expense may be a trifle higher. There are a number of charts in handbooks which show the enormous waste due to improper packing of rods or plungers.

Great care must be given packing on pistons of inside packed pumps, and if the edges commence to wear the pump will handle less, or what I term pump slippage, therefore the selection of pump piston packing is very important, and to get proper packing specify the condition under which the pump is to work or perform and let the manufacturer recommend the proper packing and have him stand behind his recommendation, the more resistent a packing is the better it will wear.

Exposed steam chests, heads of cylinders and other open surfaces will allow steam radiation and cause waste of heat, and should be insulated.

In most pulp and paper mills there are from ten to hundreds of steam traps, and sometimes steam will escape through open petcocks of the traps or through leaky traps itself, which is caused at times by a binding or sticking trap, worn parts, improper adjustment. Traps should be inspected at least once weekly and worn parts replaced, because the small cost for worn parts will be greatly outbalanced by the saving of steam, and in consequence of fuel. The writer would recommend the substituting of petcocks with plugs. Often it is seen that steam is discharged with the water, whereas the trap should only discharge water, but if steam is discharged with the water a test should be made to ascertain the actual waste of heat. There are table and formulas how to make this test in hand books, therefore the writer refrains from repeating, but will be glad to furnish the reader with actual data if requested.

Losses in Factory Buildings

HUNDREDS of thousands of heat units are lost daily by faulty construction of buildings. Heat escaped from various sources is carried away by ventilators, open windows, monitors, etc. In 95 out of every 100 cases this loss can be checked and remedied at the source, but this last paragraph would require a great amount of space to cover it, that the writer will not undertake to go any further, as there are more departments with different kind of waste I wish to speak of, but before concluding this chapter would say that no one person alone can accomplish much to remedy this waste, unless every single person from the manager down to the day laborer assists in checking this waste. A laborer, for instance, may not have the authority of stopping such waste or leaks, but he can at least report it to the proper foreman, as it does not cost him any effort to step into the department foreman and advise him what he has observed, he may get snubbed the first time, but any foreman who is interested in the welfare of his company will pat Mike on the back and thank him for his alertness, and Mike may not get a five-dollar gold piece right on the spot, but wide-awake fellows are always remembered. He at least has the satisfaction when the leak or waste has been eliminated, that he was the cause of this one saving. How well business would flow along if plants had many Mikes. Come forth, you Mikes, and look around yourself, don't let the "super" do it all.

The Wood Yard

IN THESE times of keen competition the best place next to the boiler house, to start economy, is the wood yard, as it is here where the actual making of paper begins, that is in mills where wood is used as the basic raw material.

The writer believes that the handling of wood should be considered first, as this is in some instance a very expensive process and therefore very important. While the yard conditions vary and are different in every mill, the handling of wood, from the unloading to the wood room should not exceed 75 cents per cord, but there are mills in the States and also in Canada, whose wood handling cost runs as high as $2.25 per cord. While the writer is not able to set a certain plan for handling wood, which would be adaptable for any mill anywhere, he yet believes that by a careful analysis of conditions of the yard and mill this cost can be reduced very materially, and if there are no extraordinary conditions the handling cost should be less than $1.00 per cord.

I don't mean to say that it requires an expert to work out each individual case, but any mill manager who can devote some time to this problem can solve it one way or the other, because it is he that understands the condition of the yard and mill best; of course in most cases the manager of a mill has so many irons in the fire that he cannot sit down undisturbed for a day or perhaps a week to work on this problem, and ofttimes when he can he is handicapped when it comes to investing a little money for equipment, although in many cases an investment of say $50,000.00 would pay for itself in two or three years

—at least would pay the investors a handsome profit. Stop to think a minute that there are some mills whose wood handling costs run into $100,000 and over per annum, and their average production is from 100 to 150 tons daily.

Pulp Wood Storage

In many mills the pulp wood storage area is very great, and often a large cordage of wood is stored, with the consequence that wood remains in the yards before it is used, and the deterioration is enormous.

Pulp wood, to make good pulp, should be seasoned for about one year and then used up; in no case should pulp wood be left laying in the yards over two and one-half years. In order to keep tab on the age of the wood, same should be stored in as many piles as possible, and then the first pile should be used up first, then the second, etc., and new incoming wood piled at the area of the first pile, etc. Also keep in mind the fire hazard when storing in piles. For this reason piles should not be higher than 45 feet, not exceed 150 feet in width and 450 feet in length. Leave a space of about 100 feet between each pile, so if you should have the misfortune of a fire in one of the piles, the loss will not be as great, and it is much easier to fight the fire.

In some of the more modern mills one finds about six monitor nozzles to each pile, two on each side and one on each end, which in turn are protected with a half circle reinforced concrete wall against falling logs—these nozzles can be adjusted in any direction, and, once set, do not require human element to fight the fire. At some mills, mostly soda mills and a few of the sulphite mills, where high-grade bleached pulp is being made, dry wood is preferred, and it should, therefore, be worth while to adopt piling methods, which is easily accomplished, especially with wood in 4 foot and 8 foot lengths. This is more difficult, of course, with 2-foot wood, but there are only a very few mills who are using 2-foot wood.

Piling will not only allow the air to circulate and reduce the moisture in the wood considerably, but it will also allow the ground to drain properly where the wood is piled. Punk wood is a very important problem in the manufacture of pulp. Most every pile contains some punk wood, same being brought in from the forest, or caused by piling or by handling with conveyors and distributed all over the pile—at some mills where they are on the lookout for good uniform pulp. This punk wood is carefully separated from the good wood and used for fuel; but even for fuel this wood does not seem to be of much value, and while we are inclined to think that we cannot afford to throw away a few cords of punk wood and cannot afford the spending of time to sort this type of wood out, just ask your sulphite superintendent the next time you have a talk with him, and he will tell you also that he would much rather not cook punk wood together with the good chips.

Another large loss is due to fungous growth; it has often been related that rotting of wood is due to a chemical reaction; this may be the fundamental, similar to the rusting of iron, but the writer believes that fungi are the cause of rot and not the result of chemical action. Large quantities of pulp wood are being destroyed yearly in paper mills by fungous growth; but only a few varieties of fungus are causing the destruction of pulp wood, which is due to the fact that only a few grades of wood are being used for pulp.

No doubt you are familiar with the fungus family, but let me give you an introduction to some of them, in which we are interested right now. There is the Lenzites Sepiaria, the most destructive for spruce, hemlock or pine. Fomes Roseus is also found in spruce, hemlock or pine. Fomes Hirsutus specializes on poplar and others. The only way to stop spreading of fungous growth is by keeping the wood at a certain moisture. A definite remedy cannot be given as each individual case requires a careful study. Considerable money could be saved, however, by keeping the fungous growth away from the wood pile, as fungi infected wood will produce less uniform pulp and will give a smaller yield.

The Wood Room

IT IS quite difficult to relate, briefly, how to reduce waste in the wood room. In order to go into same quite thorough, one would have to take mill after mill and work out a special treatise for each one. The largest waste in the wood room is the sawdust, yet sawdust must be removed from the chips if one wishes to make good pulp, but sawdust can be very materially reduced by maintaining sharp chipper knives. These should be sharpened twice in every nine hours, or be replaced with sharp ones without losing time on the chippers; therefore they must, or rather should, be changed during lunch hours and in the evening. If knives are properly set, according to grade of wood and process of making pulp, uniform chips will be obtained and sawdust very much reduced.

Some mills are blowing their sawdust into the boiler house to be burned up in the furnaces. Sawdust is not only detrimental to the fires, but it has even very little heating value, and if forced draft is used under the furnaces the adjoining buildings are constantly endangered to fire, unless the stacks are provided with spark arresters. The writer has seen spark screens on stacks made of No. 12 gage wire and four meshes to the inch, and yet sparks would fly around, and in time these screens would fill up and had to be removed and replaced with new ones. What a waste! Why not dispose of the sawdust for ice-houses or stables, or why would it not be better to commercialize the sawdust as a by-product? Very

good results have been obtained at foreign mills by compressing the sawdust with a binder under heavy hydraulic pressure in brick form and disposing of same for fuel, as in this form sawdust has some heating value, the same as solid wood. Some mills extract wood alcohol, although this is quite an expensive process. Some German mills are now experimenting in extracting sugar from same; and most recently Van Wessen of Holland has developed a proceess whereby he is able to manufacture pulp, which, it is claimed, is very satisfactory for some grades of paper.

Use of Corn Starch in the Paper Mill

By HANS WREDE

Translated by Clarence J. West, Chairman, Committee on Bibliography, Tappi, from Papierfabr, 20, 1429-1433 (Oct. 14, 1922)

THE use of starch in paper has been known to the paper maker for a long time, and the advantages which are gained by the addition of starch in the manufacture of paper have been discussed in many contributions to the trade journals.

If one tests papers of the last hundred years for starch by means of dilute iodine-potassium iodide solution, it will be found in a large percentage of these papers. That starch in most papers improves the manufacture is an unquestioned fact. Frequently within recent years the question has been raised as to whether the price of starch stood in a favorable relation to that of other raw materials. In 1913, 100 kilos of halfstuff cost about 20 marks and 100 kilos of starch 30 marks. Under these conditions starch was used by the paper industry. Today, when the price of halfstuff has increased more than a hundred times and the price of starch is nearly as high, there is no question that the use of starch gives just as satisfactory results as earlier. The addition of starch not only gives more favorable manufacturing conditions, but it also improves the quality of the paper.

1. Starch, which is changed upon heating to a swollen condition, is added to the Hollander. This addition of the starch in a kind of a colloidal condition causes a better retention of the small fine fibers upon the paper machine than is true without the use of starch.

2. All those papers, which are loaded with mineral fillers, lose in strength through this loading. This property is restored by the addition of starch. In this way a part of the expensive pulp is replaced by cheaper fillers, thus producing a much more favorable manufacturing condition.

3. The addition of starch causes the retention of a large part of the sizing compound by the paper, which is an advantage in the sizing of writing papers. In the use of pigment colors, especially today with the high prices of such colors, the use of starch is irremissible.

Up to 1914, potato starch was generally used in the paper mills. Because potatoes have become a very important article of food since the war, there is very little potato starch on the market. Imported starches, especially corn starch, are now the cheapest starches available, in spite of the difference in value between the mark and the American dollar. There is little difference between corn starch and potato starch as to their value in the paper industry. Other starches, such as rice starch, do not enter into the question. Starch can be used profitably in paper manufacture in the following ways:

Seven Ways to Use Starch

1. In addition to rosin sizing: After complete sizing with rosin and alum, starch in a swollen condition is added to the whole stuff in the Hollander. This use is advantageous for all kinds of writing papers and those papers which should possess a certain degree of resistance to ink and other liquids. In order to obtain as favorable a yield as possible of starch, one adds water glass—even though in small amounts —to the starch, so that this is retained in the paper as the result of the subsequent addition of alum.

2. As sizing for printing papers which are loaded with a large amount of filler, and for those papers in which a high strength is desired, as, for example, in Kraft papers, which do not need to be entirely water resistant. The author has previously given the first mentioned method the name "mineral starch sizing." No rosin sizing is necessary. Rosin size may be added, however, if it is desired that the paper be more or less resistant to the penetration of moisture.

3. Starch is added as a filler in writing and printing papers, as well as to carton paper. In this case the starch is added in the raw, non-pasty state; it is advisable, however, to add to this starch a portion of starch which has been changed into the swollen condition.

4. A specially treated starch, so-called thin-cooking starch, is used for the surface sizing of writing paper and those papers in the surface sizing of which animal glue was previously used. The price of animal glue today is so high that it should be largely replaced by the starch just mentioned.

5. This water-soluble starch forms a complete substitute for casein in the preparation of art-printing paper.

6. If it is not desired to entirely replace casein, a mixture of dissolved casein with water-soluble starch is a suitable material for coating art-printing paper.

Water-soluble starch is miscible in all proportions with casein.

7. The use of ordinary starch and thin-cooking starch as adhesives for cartons will be discussed below.

The replacement of rosin size plays more of a role today than ever before. It should be specially pointed out here, however, that rosin size cannot be completely replaced by starch in writing paper and other papers which must be impenetrable to aqueous solutions of inks. In such papers starch addition will save a third of the rosin size. Starch is a carrier for all small particles, as, for example, the finest beaten fibers and fiber fragments, the precipitated sizing agents, fillers and pigment colors.

It should also be mentioned that the addition of starch to the Hollander without special precautions will be accompanied by a certain loss. The author has therefore adopted the policy of mixing water glass with the starch and then precipitating the former with aluminum sulphate.

Use of Starch in Writing Papers

Starch confers upon writing paper better sizing, an increased strength and better finish. The erasing properties are improved, since the paper is harder and tougher because of the silicate-starch compound. While paper which is not treated with starch in combination with water glass gives fibers when erased with the knife, paper so treated gives a kind of powder which is less damaging to the erased surface.

As mentioned above, the yield of starch without water glass addition is often poor. This may be explained as follows: Starch grains, which become swollen upon heating, take up water with an increase in volume. Upon further swelling, that is continued absorption of water, through heating, the walls of the starch grains burst, upon which the starch becomes very soluble in water. If, however, the swelling process takes place in the presence of water glass, the starch grains absorb both water and water glass and, upon subsqeuent addition of alum, aluminum silicate precipitates out, being nearly insoluble, in combination with the starch.

While precipitated aluminium silicate, when dried, forms a powder, water glass in combination with swollen starch, after precipitation with alum and subsequent drying, forms a coherent, horny, pasty mass.

The following example gives the directions for a Hollander with a capacity of 600 kilos dry halfstuff. The sizing is carried out as usual, though a third of the rosin size may be saved. After the addition of alum, the starch mixture is added, and stirred for about five minutes.

The starch mixture is prepared as follows: 4 to 6 liters of water glass are added to a wooden or iron tank about two-thirds full of water. Since water glass is heavier than water, the two must be mixed by steam; this requires from 2 to 3 minutes. The steam also heats the water until it is lukewarm, which is a suitable temperature for the addition of the starch. 20 to 30 kilos of starch are now added and the mixture stirred somewhat. The current of steam is sufficient to maintain the further necessary circulation of mixture. Steam is added until the mass starts to thicken. Addition of cold water prevents further swelling of the starch. Best results are obtained if the freshly prepared, warm starch mixture is added directly to the Hollander.

It will be observed that the pulp upon the wire of the paper machine appears to be more slimy. This is due to the fact that the finest fiber fragments and other suspended particles are retained by the pulp.

Starch in Printing Papers

The use of starch in printing papers is not new. The value of the retention of fillers in such papers has been known by the paper maker for a long time. Some mills size with rosin and starch. Many mix cooked starch with the rosin size, while others mix the fillers with cooked starch in order to increase the yield of these fillers in the paper.

Another method consists in adding water glass. The so-called water glass sizing, first proposed more than 50 years ago, was repeated by various investigators but was not successful. One may perform the following simple experiment: Water glass is precipitated from an aqueous solution by aluminium sulphate, the precipitate kneaded into a ball and dried. As long as this ball is moist, one may well assume that the precipitate possesses sizing or adhesive properties. After completely drying the material, however, it is at once evident that the mass can be crushed to a powder. In this case the precipitated silicate plays only the role of a filler, the use of which however is too costly.

The reaction assumes quite a different character if the water glass is mixed with swollen starch and then precipitated with aluminium sulphate; the ball formed from this precipitate is also solid and after complete drying is horn-like.

This reaction has been used by the author as a basis for a method of sizing. The precipitate which results in the Hollander is a suitable carrier for the fillers and also provides against a loss in strength in the paper. Experiments in large printing paper mills have demonstrated that in spite of the high filler (ash) content, in many cases as high as 30%, the strength of the paper is still perfectly satisfactory.

Further, one must inquire as to the purpose of the sizing materials: What does one secure by their use? While writing paper must be resistant to inks, that is, aqueous solutions, printing paper must be resistant to the fatty printing colors. Rosin size is not resistant to such pigments and is therefore not a suitable material for printing papers.

The use of starch and water glass is about as follows: A wooden or iron vessel of about 200 liters'

capacity is filled half or two-thirds full of water, 10 to 30 kilos of water glass added, the two mixed as described under I, with a current of steam, 10 to 30 kilos of starch added to the lukewarm silicate solution, the whole stirred and a rapid current of steam passed in until the mixture begins to thicken. This time may be observed by the bubbling of the mixture, but the reaction should be carefully watched and the steam cut off at the proper time. Quick addition of cold water prevents further swelling of the starch. Care should be taken to avoid accidents, such as boiling over and scalding of the workmen. The eyes should be protected from the alkaline water glass solution.

The above described starch mixture is sufficient for a Hollander holding 600 kilos. The order of adding the materials to the Hollander is: filler, starch mixture, alum.

The neutralization of technical water glass requires 20 per cent of alum (aluminium sulphate), while a 5 per cent excess is desirable.

Uncooked Starch as a Filler

If starch is not a carrier for the filler, the yield, that is, the amount retained by the paper, will be very small. The author proposed to add, in addition to the uncooked (raw) starch, a certain amount of cooked or swollen starch. Since these two additions consume too much time, one might heat a starch suspension in such a way that only a small part would become pasty, while the greater part remained unchanged. In order to increase the yield, it is sufficient to add 2 to 4 liters of water glass to a Hollander of 600 kilos' capacity. The addition of only raw starch is held to be a waste except in paper of high reamweight, whose pulp is very slimy.

Raw starch in paper first becomes pasty upon the drying cylinder of the paper machine, where the starch grains are burst by the heat and water content. The drying grains bind a number of fibers together, which produces a considerable strength in the paper. One may use varying proportions, such as 30 kilos water glass and 5 to 10 kilos of starch, more water glass or more starch. Starch increases the strength, water glass the filler (mineral) content. Starch is more costly.

Water Soluble Starch for Surface Sizing

Previously only animal glue was used for surface sizing; that glue which swells with difficulty and slowly is the best for this purpose. Animal glue, however, has various disagreeable properties. It contributes to the yellowing of the paper, is dark colored, often possesses a disagreeable odor and is expensive. Certain modifications of starch are soluble in hot water, forming a watery solution which thickens only at rather low temperatures. Such water-soluble starches are called thin-cooking starches. The degree of the capacity to form very mobile solutions upon boiling is designated by the numbers 90, 75, 55, 40. Thus thin-cooking starch 90 forms a very mobile solution, 40 is only slightly mobile, while ordinary unchanged starch, upon boiling, is thick and paste-like.

This transformed starch possesses the remarkable property, upon drying, of becoming hard and difficultly, or nearly, insoluble. If a sheet or strip of paper is passed through a 5 to 7 per cent bath of such starch, practically the same results are obtained as by the use of animal glue. Glue, however, is more resistant than transformed starch and repeated experiments have shown that a third of the animal glue formerly used in combination with a 5 to 7 per cent bath of changed starch yields the best results.

Two per cent alum (aluminium sulphate) should be added in order to make the solution permanent. The temperature of the bath must be maintained at about 50° C.

In the preparation of thin-cooking starch, a weighed amount of starch is first rubbed up with cold water and thoroughly stirred until all the starch is in suspension. This suspension is then heated with steam until the starch solution is clear, transparent and mobile. To further dilute this to a 5 to 7 per cent solution, it is poured into water heated to 50° C.

Water-Soluble Starch for Art-Printing Paper

At first animal glue was used for binding the fillers used as a coating. This was later replaced almost entirely by casein. The many disagreeable properties of casein made it highly desirable to obtain a substitute. Frequent interruptions in printing and the very disagreeable odor of art-printing papers coated with casein may be avoided if the transformed (water-soluble) starch is used in combination with the reactions given by the author. In this way the cost of manufacture is cut in half and the manufacturing operations are much simplified. The inconvenient losses of casein by alkali are avoided, and are replaced by simple boiling of the starch, followed by addition of alum and water glass.

Paper coated with starch is absorptive and not brittle.

Casein and Starch Coating for Art Printing Paper

Every change in method of manufacture in a large mill is a hazard coupled with a responsibility. The change from casein to starch is an important one, even as was the change from animal glue to casein. On the other hand, each addition of starch solution to casein brings about a considerable reduction in cost, in addition to the advantages mentioned above. It is now possible to mix the casein-filler mixture in any proportion with the described starch-water glass mixture. However, the greater the proportion of casein, the less absorptive is the paper.

Finally art-printing paper coated with casein, spotted with very dilute iodine-potassium iodide solu-

tions, is colored a pale yellow; any addition of starch is recognized by the intensive blue color.

Cartons from Several Sheets

In preparing a carton from several sheets, two kinds of starch may be used; ordinary starch, cooked to form a thin solution, or soluble starch.

If one wishes to run the pasting machine faster or if one wishes to use more starch in order to give a "feel" to the carton, soluble starch should be used. More adhesive may be used in less water and thus there is less water to evaporate again than is the case if one uses a smaller amount of ordinary starch in a larger volume of water; this naturally results in a considerable saving of coal.

When used as an adhesive the starch solution should be maintained between 60 and 70° C.

The Fourdrinier Machine

By HARRY E. WESTON

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This is the second installment of the article on the Fourdrinier machine in preparation by the author. Further installments will appear in succeeding issues.
—Editor

Couch Rolls

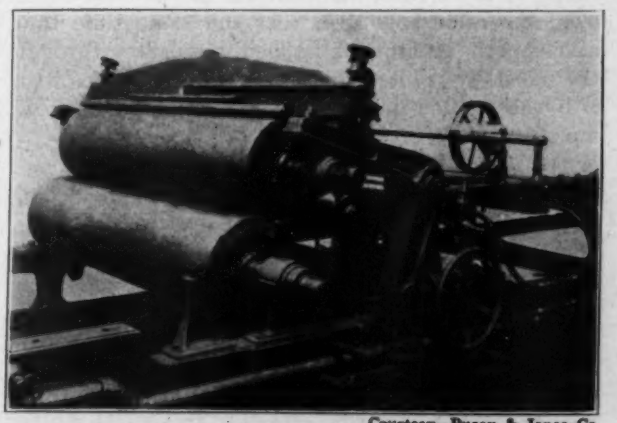
THE web of paper, carried along with the wire after passing over the suction boxes, passes between two rolls, called couch rolls, where still more water is removed from the sheet. The name "couch" is derived from the French verb "accoucher," signifying birth. In this case it signified the birth of the sheet of paper. The bottom couch roll is made of brass. It must be carefully ground to a smooth and true surface. The upper roll is also of brass, but is covered with a wool felt (a seamless tube) called a jacket. This jacket is put on dry. It is then sewed around at the ends with cord, and shrunken with hot water. The work of shrinking should begin at the center, and proceed toward each end. Pressure is applied by means of compound levers and weights.

Sometimes the jacket may give poor service. This may be due to faulty construction, or to stretching, shrinking or pulling. The most common trouble is for the jacket to stretch in the center. This condition is brought about by the center always traveling faster than the ends due to the slight crowning of the bottom roll. This fault does not necessarily mean poor manufacture but may mean that the weights on the couch roll ends are not kept even. It may also mean that the guard board presses too heavily. With a very small amount of slack in the center of the jacket no harm can be done; but as soon as it becomes excessive, the machine must be shut down and the couch roll lifted, just as in putting on a new jacket, and then the jacket must be pulled forward and resewed at the ends to take up the slack.

The top roll is so located with relation to the bottom roll that its line of center is offset from 4 to 8 inches from the vertical line running through the center of the bottom roll. This arrangement has been devised so that the paper will be gently squeezed against the roll before it is subjected to the heavy pressure at the line where the two rolls meet. It allows a straight fall-away for the water removed from the paper by the rolls, and prevents the sheet from being "curdled" or "crushed."

The bottom roll is connected with a clutch and driving arrangement and is used to drive the entire Fourdrinier part.

The guard board is made from hard pine plank or cypress—usually from 18 to 24 inches wide and about 4 inches thick. It is trussed on the back and top, and is supported at each end by brackets extending from the upper couch roll housing. A lip, made of maple,



Courtesy—Pusey & Jones Co.

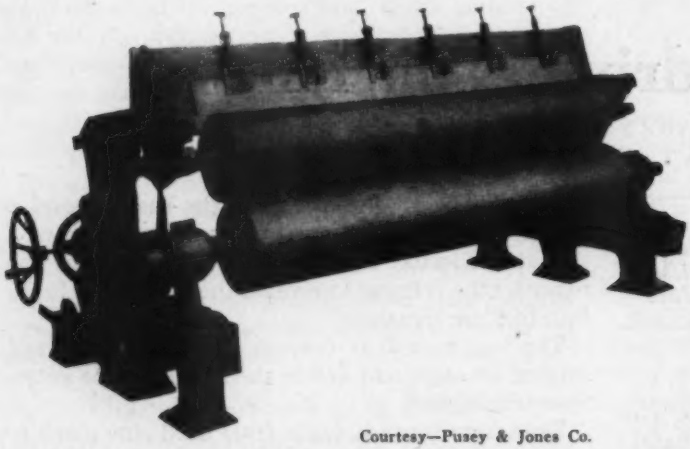
Pair of couch rolls—couch roll housings with geared lifting arms, heavy guard board, standard type usual shower pipe and dam roll

about 1 inch thick, and beveled at its lower edge to about ¼ inch, is attached to the guard board with iron brackets. Springs are provided to care for some up and down motion of the lip as it presses on the couch roll jacket. This lip is set at an angle so that it will press out moisture and will also retard any pulp or dirt. A shower pipe located directly in front of this lip and extended across the couch roll facilitates the removal of pulp and dirt, thus keeping the jacket clean. The lip is so located that it touches the roll at a point just back of the center, forming a shelf for water to rest in. A wiper consisting of a strip of felt hangs from a wooden bar extending

across the roll and aids in maintaining the pond of water.

Suction Couch Rolls

The Suction Couch Roll is designed to take the place of the old style top and bottom couch rolls and by so doing eliminates the use not only of the jacket and guard board, but also of the arms, levers and



Courtesy—Pusey & Jones Co.

Couch rolls, housings, and Gateley patent guard board with adjustable blade

weights. Atmospheric pressure replaces line pressure. It is constant and uniform and is distributed over a considerable area. At the same time that atmospheric pressure is applied, air passes through the moist sheet into the suction roll and carries with it by absorption and as free water some additional moisture.

The stationary suction chamber of the roll is connected to a powerful vacuum pump. Special hydraulic packing is used to make contact between the suction chamber and the inside surface of the revolving shell. The amount of vacuum that may be maintained at the suction couch roll is largely determined by the weight and character of the paper being made. A deckle arrangement is provided so that adjustments for any width paper being made on the machine may be accommodated. Suction Couch Rolls as large as 30 inches in diameter have been made. The size of the roll would determine the size of vacuum pump to use.

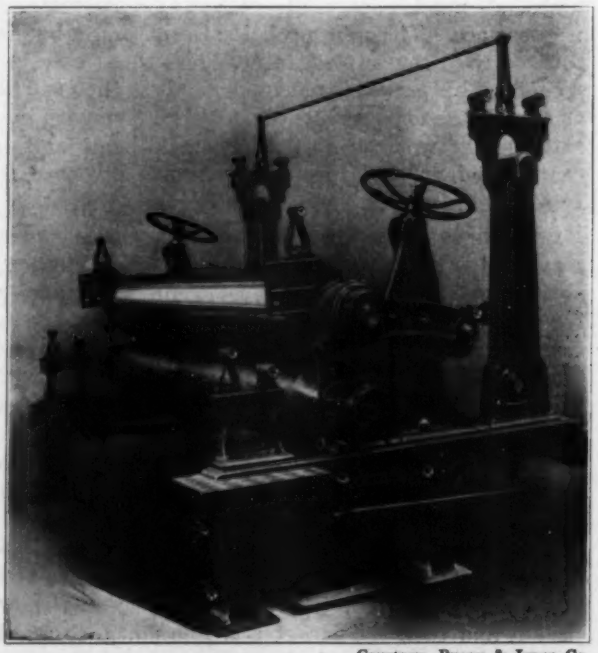
The operating advantages of the Suction Couch Roll over the old type couch is that crushing is eliminated, pickups are avoided and breaks occur less frequently. Damp streaks are also avoided as the atmospheric pressure is constant and uniform. The vacuum carried on the flat suction boxes may be reduced, and in some cases the number of boxes may even be decreased.

Press Rolls

The sheet after leaving the couch rolls passes to the press rolls. It runs on a woolen felt from the wire to and through the press rolls. The first press comes next to the couch rolls. The number of presses used is determined by the particular type of machine used. The bottom roll of each press is made of iron covered with about 1 inch of rubber. The surface of the roll is crowned so that the weights that are applied to the ends of the upper roll will not squeeze the sheet unevenly. It is also necessary that the roll be ground perfectly round and true.

On top of the bottom press roll rests the top press roll. The roll may be of wood or metal. In some cases a gun metal casing is shrunk over the ordinary roll. The felt, previously mentioned, runs between these rolls and a stretch roll which keeps it tight.

The top roll is connected up with compound levers and weights. The crown of the rolls must be sufficient to offset any spring in them caused by the use of the levers and weights. Otherwise the rolls would pinch on the ends causing more water to be pressed out from the sheet along the edges than in the center of the rolls. There is no definite formula for giving the proper amount of crowning. It simply comes by experience in knowing the flexibility of the rolls, the width, the hardness of the rubber, and, in fact, the peculiarities of the machine as a whole. It is easily seen that the metal rolls require less crown than rubber as they have less to give them.



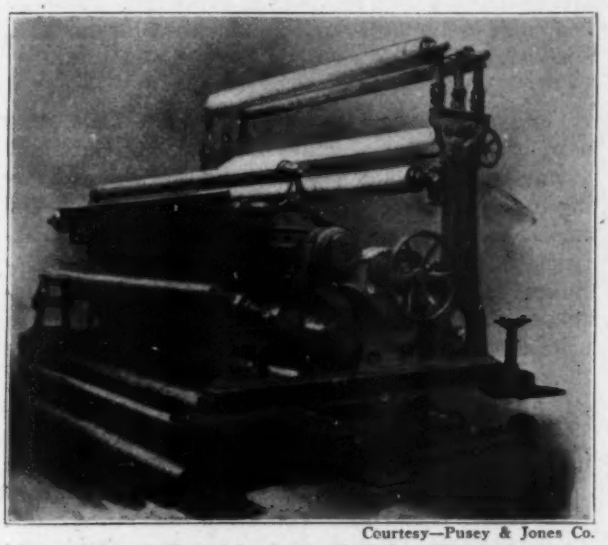
Courtesy—Pusey & Jones Co.

Pair of press rolls—Press roll housings, swinging arm type, suitable for paper machines up to 100" wide

Sometimes a sheet will run through the presses with damp edges and dry middle. Too much crown on the rolls will cause this condition. At other times

the sheet will show up damper in the middle than on the edges. This condition shows that the rolls need more crowning, provided an even sheet is being made on the wire.

The second press and others are the same as the first. A sheet after passing through three press rolls



Courtesy—Pusey & Jones Co.

Press rolls and housings with Bell-crank arms

contains approximately 65 to 70 per cent of water which must be properly evaporated by passing it over dryers.

The top roll of the first press is often offset three or four inches as was the upper couch roll and for the same reason. A doctor blade of gutta percha or hard maple is provided for each top press roll. Usually the bottom of the maple doctor blade is protected from direct contact with the roll by pieces of felt.

Suction boxes similar to those beneath the wire are located under the felt just in front of the pinch of the press rolls. This location gives to the sheet the benefit of suction just before it passes through the final squeezing of the press rolls. The paper is prevented from "blowing." "Blowing" is the term used when air is allowed to get between the felt and the paper and thus forming wrinkles when squeezed out by the press rolls. The suction removes the air from between the felt and paper, aids in keeping the felt clean, and sucks out the excess water.

Suction Press Rolls

Suction press rolls are designed to take the place of one of the press rolls and to remove water from the paper by suction while performing the usual functions of the ordinary press roll.

A suction press roll is quite similar to the suction couch roll except that it is surmounted by the usual top press roll. It is normally installed as the bottom roll in the first pair of press rolls. The roll performs several functions:

1. Dries paper more efficiently.
2. Removes pond of water from nip of rolls.
3. Prevents paper from sticking to top press roll.
4. Keeps felt open and clean.

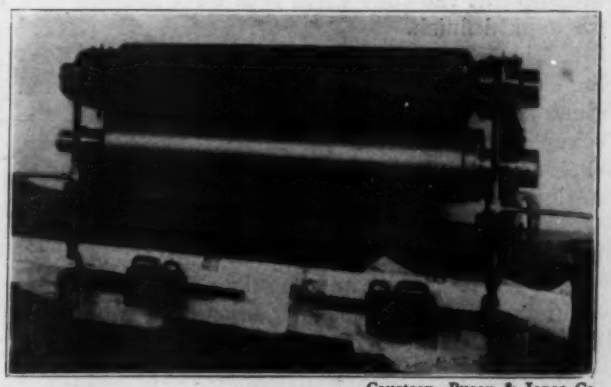
A pond of water is usually observed at the nip of a pair of plain press rolls during the operation of the machine due to the inability of the water to escape. The suction press roll removes this water and therefore maintains a dry nip which means less crushing, blowing, and felt marks in the finished paper. Large volumes of air are caused to pass through the felt continuously by the suction press roll. This movement of air aids in keeping the felt open and clean. The paper made is not subjected to as harsh mechanical pressing, since the top press roll does not require as heavy pressure as in the old type press roll.

Suction press rolls have been extensively used in making kraft, news, bag, sulphite bond, glassine, manila, fruit wrapping and other papers. Machines making straw papers and roofing papers are also often equipped with suction press rolls.

Smoothing Press

The smoothing press, as compared with the true presses which have as their function the actual pressing out of water from the sheet of paper being made, is not, technically speaking, a press. Its function is to smooth and flatten out the sheet of paper between two rolls before the sheet goes to the dryers. Wire and felt marks are removed and an initial smoothness is given to the sheet such as is not possible after the sheet has been dried.

The upper of the two rolls is covered with rubber. The rubber used for the covering is of less hardness



Courtesy—Pusey & Jones Co.

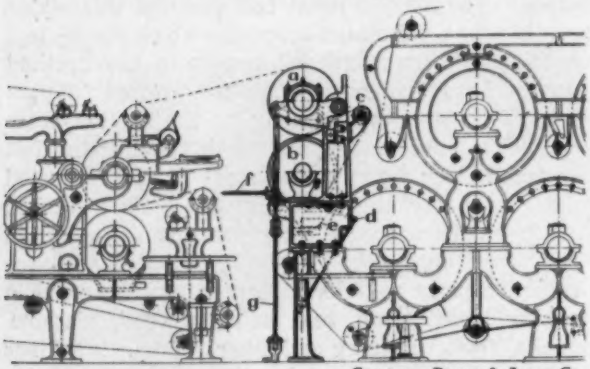
Smoothing Press

or density than is ordinarily used on the main press rolls. The lower roll is cased with a special composition of gunmetal and is ground very smooth. Little crown, slightly more than given to the upper, is given to the lower roll.

The success of the smoothing press is largely dependent on the care with which the upper roll is made. The hardness or density of the rubber used

as the covering must be right so as to insure perfect smoothing action. The smoothing action must be uniform across the entire width of the sheet.

The damp web of paper is led over and around the upper roll and passed between it and the gunmetal roll underneath. It is then carried to the first dryer. This method of operation, the passing of the paper



Courtesy—Pusey & Jones Co.

A smoothing press installation

a—Rubber covered roll; b—Gunmetal cased roll; c—Pulley or belt-feed device; d—Improved ductor with Tension arrangement; e—Fluff-catcher and Save-all; f—Ratchet wrench to raise upper roll; g—Pressure applied to upper roll by levers and weights and rod (g)

around the greater part of the upper roll tends to make the pull on the paper stronger in the middle than on the edges thus avoiding the tendency of tearing the sheet.

Many advantages are derived by the use of a smoothing press in the manufacture of several grades of paper. The most important advantages may be listed as:

1. All wire marks and felt marks are removed from the sheet at the time when it is most adapted to a mechanical finish.

2. The fibers in the sheet are smoothed, thus allowing closer contact with the surface of the dryers and eliminating air-spaces between the paper and the dryer with which it is in contact. The paper can, therefore, be dried better with the same amount of drying surface, or with a lower temperature.

3. The strength of the paper is increased several points.

4. The resulting paper requires less calendering and retains its finish better than one which has been glazed on the calenders.

5. Operation of the press is carried on efficiently on various grades of paper at speeds ranging up to 500 feet per minute. It is particularly useful in the manufacture of book and writing papers which are being manufactured on machines running at moderate speeds. It is also useful in the manufacture of blottings and some specialties such as vegetable parchment.

A smoothing press may be installed on any machine in place of the usual baby or receiving dryer. The rolls are made of the same size and are interchangeable with the main press rolls. A pulley or belt feed device guides the paper into the nip. An improved doctor with tension arrangement keeps the surface of the lower roll smooth and clean. A fluff-catcher and save-all is placed under the lower roll and can be easily removed. A ratchet wrench arrangement is used to raise the upper roll. Pressure is applied to the upper roll by means of levers, rods, and weights.

Wet Felts

Felts of pure wool have been used since the early days of paper manufacture for carrying the sheet during the process of pressing out the water adhering to the fibres. At first they were simply pieces of woolen cloth cut to the size of the molds for hand-frame work, but along with the introduction of machinery came woolen felts. The early Fourdrinier machine was equipped with sheets of felts made into belts by sewing the ends of the felt together. More than 50 years elapsed before felts were joined and still a greater length of time before they were woven. The first felts used on machines in this country were imported from Europe.

The real beginning of the papermakers' felts in this country began about the end of the Civil war and since that time the industry has of necessity grown to meet the need created by the growth of the paper industry.

The functions of papermakers' felt, according to Huyck's "Two Related Industries" are:

1. To couch the paper, or, in other words, to pick it up from the cylinder or from the Fourdrinier wire.

Courtesy—F. C. Huyck & Sons Co.

Typical view of joining room

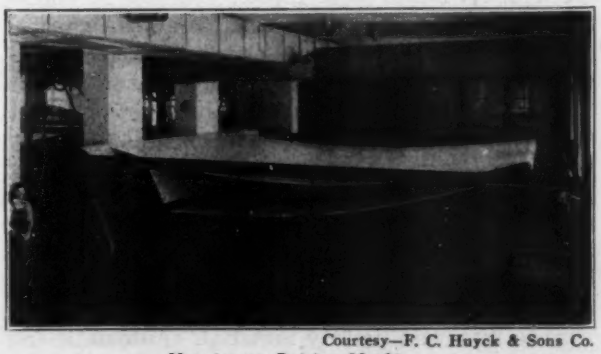
2. To act as a carrier to succeeding parts of the machine.

3. To act as a filter, allowing water pressed from the paper to pass through its meshes and run away, thus aiding in the drying process.

Wool fibre is generally considered the only textile fibre against which a wet sheet of paper may be pressed to remove the water and from which this water may again be removed by pressure, and is

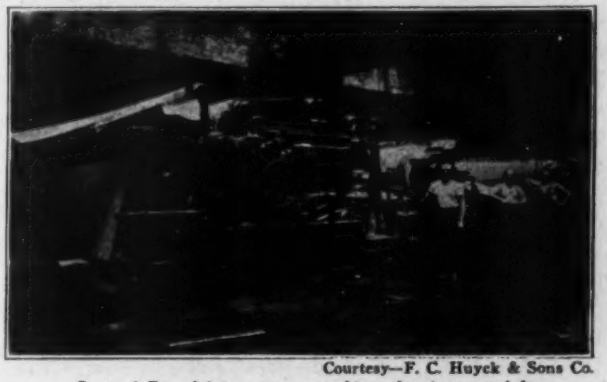
also considered as the only fibrous material which will pick up a sheet of wet paper from some other carrying medium and deliver it to a desired point without paper stock adhering to it and without injuring the sheet. The felt will, however, take up a certain amount of stock, or filler run with the paper. This necessitates washing either by a constant shower of water upon the felt at a point where the felt may be beaten with a felt whipper, or by washing on the machine. Tests have been made to determine if cotton in a felt injures the felt for its purpose; that is, whether paper could be couched on a felt containing cotton. Cotton warp seems to possess certain advantages on felts used for special purposes, such as in the manufacture of asbestos paper. On the other hand, it had been shown that very good appearing felts, containing cotton warp and run on Fourdrinier machines, have a tendency to cause the stock to stick to them.

The process of making these felts is much the same as is used in making any woven woolen cloth. They are in reality blankets and not felts. The wool used in their manufacture comes from all over the world. It is first assorted into the desired number of grades, sometimes 5 or 6 from a single fleece, these being determined by the length and size of fibre. Some dirt, vegetation, strings, etc., are removed by the assorters in their work. The sorted material is then sent to the dusters, where it is prepared for the scouring process in which the impurities are removed and also the wool opened up for the subsequent operations. It is then carded and spun into yarn of a certain standard by a process of drawing, twisting, and winding. It is now ready for the weaving operation in which the yarn is so arranged as to form a firm



Courtesy—F. C. Huyck & Sons Co.
Napping or Raising Machine

piece of cloth. This is done by placing the warp yarn so as to make a close network of threads extending lengthwise of the felt in the process of manufacture. The filling yarn is then woven into the warp to complete the fabric. Strength and necessary lengthwise pulling qualities are given to felts by the warp, while the filling makes up the surface of the felts and from its threads the nap is raised. Faults or flaws in the felts are removed in the process of burling. Knots and other imperfections are corrected. If the felts have not been woven seamless they are ready for joining. This operation requires much skill as the felts are made seamless by being entirely joined by hand. The felts to be joined are placed end to end across long tables and are then drawn together with each opposite thread exactly matching. A fringe of warp is left at the end of a felt. A knot is tied in the ends of the two exactly



Courtesy—F. C. Huyck & Sons Co.
Part of Fourdrinier paper machine showing wet felt

opposite threads and then the joiner pulls the thread farther into the warp on either side. This operation is repeated until a perfect handwoven seam is made.

The seamless felt is then washed to remove oil and dirt that may have accumulated on it, and is then ready for "fulling." In this process the felt is shrunk and thickened and is prepared for the napping operation. The nap is put on the felt by the use of teasels which are placed on bearings mounted on a large cylinder. The cylinder rotates and likewise the shafts carrying the teasels. The teasels have sharp, springy points which make the nap on the felt. The amount of nap upon the felt depends upon the proximity of the felt to the teasels. The felt is then dried and inspected, after which it is ready for shipment.

A large variety of felts are used in paper making. The kind used is dependent upon the quality of paper being manufactured. Most felts used in the making of finer papers have a nap to prevent the paper from being pressed against the threads. Tissue papers require very fine felts with no naps. These felts probably give more trouble than any others because of the thinness of sheet and necessary thinness of felt and the quick filling up of the felt with stock which makes it necessary to constantly beat it.

Fifty years ago the average size of a Fourdrinier wet felt was about 24 feet by 72 inches and of a second press felt about 12 feet by 72 inches. The development of the Fourdrinier machine made necessary the making of longer and wider felts as the machine was built wider, its speed increased, and the first and second press rolls were much longer. Even a third or a fourth press was added. The invention of the Harper Fourdrinier and the adaptation of cylinder machines to the manufacture of heavy boards

and papers demanded the use of longer felts to take the paper from the additional cylinders. Felts are now often manufactured for modern machines with lengths of 40, 50 or 60 feet. The majority of Fourdrinier machines are being built for first press felts with a length of from 40 to 60 feet and with second and third press felts, in some cases, a little shorter than the first.

A felt should be carefully inspected before it is put on a paper machine. The machine should also be put in proper condition for receiving it. Rolls, boxes, and journals should be thoroughly cleaned. The press rolls must be lifted to give plenty of clearance under the rolls for the passing of the felt. After the rolls are in place, and before letting down on the press rolls, the felt should be straightened out as smoothly as possible. It should also be in proper alignment with the machine. The top press roll can now be lowered onto the felt. The stretch rolls should be tightened only enough to take care of the stock in the felt. A man should be placed on either side of the felt and in front of the press rolls.

The felt should now be run around and gradually tightened, being careful that it is not made too tight as water causes it to shrink. Water should then be used. The best method to wet down a new felt is to apply water through a shower pipe, preferably across the full length of the roll. This method allows the water to be evenly distributed as the felt runs around, and causes the felt to take up an even amount of moisture throughout its entire width, causing it to shrink evenly. A solid stream of water from a hose should never be run upon a new felt by holding it over one point as the felt is run around. This causes a wet streak in the portion mentioned and often causes a felt to run in a straight wrinkle for its entire length. This wrinkle is caused by the shrinking of the felt at the point where the water was supplied. It is generally considered best practice always to use one kind of felt, being sure that the felt used is the best for the grade of paper being made. This practice makes it easier to judge the amount of shrinkage that is to occur as it is nearly impossible to lay down definite rules in regard to the shrinkage of woolen felts. In some cases felts will often shrink in length without appearing to become narrower, while in other cases they appear to increase in length and to narrow up.

The seam on the felt should be made to run as nearly straight across the machine as is reasonably possible. A seam which runs very crooked pulls the warp in certain places to such a degree that the meshes of the felt become closed. This closing up of the meshes allows the felt to be filled up with fine pulp in this particular streak. This condition in a felt will finally cause "crush marks" in the finished paper. In case the seam presents a diagonal appearance across the felt, that is—one end of the seam runs ahead of the other—it should be corrected by the use of the stretch roll. Otherwise, the felt becomes very difficult to guide and is very apt to run into wrinkles. The cause of the seam taking this diagonal position across the felt is due to difference in circumference of the opposite ends of the group of rolls in the press. It has been found that no matter how perfectly the rolls may be constructed, the felt seam is led ahead at one point or it falls behind at another. There are so many rolls that the only method of getting rid of this trouble is to turn the rolls properly in a lathe. The press roll must also be ground, as the crowning of the bottom press roll is sure to run the seam ahead in the center if it is not offset by the balance of the carrying rolls.

Automatic guides should be supplied to keep the felt in proper alignment. They are especially valuable on the first press felts. Hand guides are often used to guide the second press felts.

The productive life of the felt is of great importance and is often dependent upon the treatment it receives at the hands of the machine tenders. The woolen fabric, even though easily torn or injured, must do its work running constantly at a high rate of speed between many heavy rolls. It is always essential that great care be taken in starting a felt as it may be very easily ruined by careless starting. No definite rule can be given as to the amount of service that will be rendered by an individual felt due to the many varied conditions under which it is required to work. The life of a wet felt may be measured by its ability to withstand chemical action and mechanical stress. It is absolutely necessary that both of them be kept as near a minimum as possible. All of the chemical forces that destroy a felt can ordinarily be ascertained and remedied by the men in the mill. A felt is more rapidly attacked by chemicals at a high temperature than at a low temperature. It is also more easily attacked when allowed to dry. In washing a felt, therefore, it is important that a temperature that is not injurious to the felt is being used. There is a tendency for the felt to shrink and to close if the temperature of washing goes beyond 120 degrees F. or 125 degrees F. Soaps and acids for washing must be very carefully applied. Small amounts of soda ash are sometimes permissible but should be strained, after it is dissolved with water, through a piece of fine cloth or a Fourdrinier wire to remove all gritty material. Automatic felt washers are also on the market and are in common use.

The mechanical foes of felts are numerous, many of them being due to carelessness on the part of the workmen. A felt is often ruined by copper tacks being indiscreetly used around the paper machine. Tacks that are liable to work out from wooden rolls having worming or listing attached should be removed or driven in when changing felts. The rolls are often wormed so as to spread the felt and counteract its narrowing tendency caused by the crown-

ing of the rolls which in turn causes part of the felt to run ahead in the center, and to thicken and narrow. Then it is essential that the felt be put on the right way. If it is put on so that the nap is brushed back against the grain when it runs through the presses, the stock may become embedded in the felt and it is practically impossible to wash it out. A felt, after it has filled up, should be washed as soon as possible either on the machine or off. After a felt has been in use for a considerable time it then becomes bare and napless on one side. Oftentimes it may be turned over so as to obtain the benefit of the nap on the other side. Excessive tension is often caused by felt whippers, tighteners, and stretchers. The nap is often removed by the action of the whippers. Felt whippers should be on the outside of the felt. Such an arrangement makes it convenient for putting on or taking off the felt and also works to better advantage in removing the dirt. Shower pipes are usually placed on the inside of the felt. The velocity of the water through the shower together with the action of the whipper forces much of the dirt out of the felt from the side that it entered.

It is generally considered uneconomical to spend very much time in darning holes in felts of modern newsprint machines. However, in case a new felt becomes torn, it is possible for an expert workman to close the break by using soft silk thread and a fine needle.

A felt sometimes becomes defective in the making. Such a felt will give unsatisfactory service under all circumstances. Slack places in the weaving often cause the felt to bag and invariably results in "crushing" the paper. Straight wrinkles may also develop in a felt through no fault of the paper maker. Such a felt should be held subject to inspection of the felt manufacturer.

In storing felts it is best to have a dry, airy room. The felts should be placed on shelves instead of on the floor with the first shelf being 6 to 8 inches from the floor. It is also advisable to keep the felts away from walls, especially concrete or brick. All felts in stock should be carefully watched to keep them free from moths. Mothballs, naphthalene, camphor, and tarred paper are often used for that purpose. A thorough inspection should be made at least once every three months.

Putting the Lid on Waste

By H. M. GRASSELT

STANDARDIZATION of products and co-ordination of correlated functions with a view of eliminating industrial waste receive today the attention of manufacturers more than ever heretofore in the history of the paper and allied industries.

The depletion of our forests (which seems to endanger our future supply of pulp wood and lumber), inflated coal prices, scarcity of labor, high wages and foreign competition are, aside from a moral and national economical obligation, a few of the factors that command the practice of thrift.

While state and federal government agencies have taken decisive steps against exhaustion of our wood supplies and while systematic preservation and reforestation of woodlands is well under way, the manufacturer himself must inaugurate war on waste in his plant. Here are vast fields of waste open for investigation, and to successfully eliminate deprecative factors requires a thorough understanding of the principles involved. No ready-made plan and no infallible formulæ for material-saving and labor-saving functions that effect profits of a plant can be given. Elimination of waste requires individual research and only an outline of the underlying factors can be given in the scope of an article.

A detailed study of each department and its practice and a careful research into the entire sequence of operations and their effects is necessary to eliminate wastages and direct losses or at least reduce them to a minimum.

Wastages and direct losses, as far as mills proper are concerned, may be classified under the following headings:

1.—**Materials**, viz.:
Inefficient Purchasing and Storing.
Waste in the Process of Manufacture.
Waste of Fuel (Power and Heating).
Invisible Waste.

2.—**Time**, viz.:
Poor organization of Labor.
Inefficient Labor and Methods.
Circuitous Intra-Factory Hauling.
Waste through poor Lay-outs.
Waste through Accidents and their various subdivisions.

A methodical and systematized investigation along these lines will procure surprisingly gratifying results and harness waste and leaks. A dependable cost system invariably will locate waste and point the way to certain circumstances requiring investigation. However, it must be emphasized that a poorly and indifferently operated system is worthless regardless of its theoretical merits and perfections. In cost finding, only facts ascertained in the mill, process to process, and not estimates or guesswork, will benefit the manufacturer. Education of help, co-operation of superintendents and foremen with the cost department are the principal factors in obtaining the objective.

Materials

Purchasing requires rare skill and true understanding, perceiving and interpreting of market conditions. The past few years with their unprecedented fluctuations in commodity prices certainly tested the ability and imagination of buyers to the utmost, and even today they have to remember that the paper industry is still in the process of readjustment.

The manufacturer should be aware that an excessive stock of raw materials represents sums of money uselessly tied up. Sufficient materials, however, must be always at hand to assure uninterrupted operations. Hurried purchases and resultant rush deliveries mean increased expenses in practically every case. Scrupulous inspecting and testing of all incoming raw materials and supplies is absolutely necessary and all receipts, no matter how small, must be checked against the vendors' invoice or specification. Receiving clerks or persons entrusted with these duties can effect substantial savings by conscientiously attending to all details pertaining thereto.

A simple, but effective stores system affords a good means of controlling materials and protecting them against waste and thefts.

Adequate storage facilities, location and temperature of storerooms are to be taken into consideration in order to avoid spoilage and deterioration of materials. Very often filler, starch and similar commodities, when stored in damp places, draw moisture, get hard and become unfit for use, depreciate in quality or entail an abnormal percentage of waste.

Pulp and rags should never be stored in places where they rot or mold and will have to be thrown away or, when used, affect the quality of the product.

Drainer stock and sizing particularly demand strict economies in order to prevent spoilage.

Tools furnish in many mills a large percentage of "invisible waste," because of their being dropped carelessly anywhere about the plant instead of being returned to the proper place. They simply disappear to "that unknown country from whose bourne travelers very seldom, if ever, return," as Shakespeare expressed himself with propriety. In mills without a storage system, the boss millwright should be held responsible for all tools and he in turn should adopt a system which enables him to keep close track of them.

General Plant

Equipment, methods and practices of the individual departments must be studied in order to obtain economical production and reduction of waste to a minimum.

Beater room equipment and labor efficiency is greatly responsible for quality and uniformity of the product. Both must, therefore, be kept at the highest standards. In the machine room, the attention should be concentrated in the restriction of the quantity of broke and poor quality of paper run. "Invisible waste" and proper regulation of heat and temperature require close watching. In the finishing room equipment and tables must be arranged according to the sequence of operations to eliminate delays, waiting time and congestion.

There are many other factors throughout the plant, that have an important bearing upon elimination of waste and economical production. Leaks, no matter how small and trivial they may seem, mean losses and a great deal of money is squandered very often unless they are stopped effectively.

Excessive hauling of material and parts is another source of continual losses. A system of conveying, properly applied, will link up every process into a perpetual functioning unit and prevent waste of time. A carefully designed method of loading and unloading cars will lessen expenditures and prevent demurrage bills.

Leather belts require proper care, they need to be wiped off occasionally and receive an application of belt dressing.

Adequate lighting is one of the most important factors in economical plant operation. In a properly lighted factory there will be less spoilage, less inaccuracy, less wasted materials and less accidents. The worker cannot be expected to do his best by insufficient light, which not only hampers his operations, but also ruins his eyesight and increases accident hazards.

Lubrication

To reduce the annual oil bill necessitates the selection of the right grade of lubricants, the introduction of methodical lubricating and their economical handling and reclamation.

The selection of the right grades of oil is at present comparatively easy, as practically all oil companies send their research engineers to plants so as to make tests and suggest the most adaptable lubricants.

Instead of storing oils in the wooden shipping barrels, they should be transferred into storage tanks. To leave them in wooden barrels means waste from leaks and contamination with dirt or glue from those wooden containers.

Used oils become contaminated with residues, such as metals, carbon, etc. A filtration system should therefore be installed in order to make these oils fit for reuse.

Accurate records of consumption are to be kept for comparison. Any abnormal consumption is to be investigated immediately and corrected.

Fuel Economy

Exorbitant coal prices, which show no downward trend, demand rigid power plant economy. Adoption of automatic stokers and coal and ash handling machines effect savings of thousands of dollars annually. The quality of coal must be watched as to their B. T. U. value, percentage of moisture, ash, etc. Firemen should be instructed in fuel efficiency. Holes in

the fire, uncovered grates, too much air drawn through fire-doors, etc., are a few factors instrumental in extravagant use of coal.

Lubricating, water softening and inspecting of boiler masonry for defects should receive proper attention. No uncovered pipes or defective pipe coverings should be found in a steam system, as proper insulating pays for itself in a comparatively short time.

Sale of Waste Material

Waste materials, such as old wires, scrap iron, felt, dust, etc., bring good returns when collected and sold. A systematical collection will not only be profitable, but add very much to cleanliness and order within the plant.

The Human Element

Excessive labor turn-over is expensive and curtails efficiency and production. To keep an organization complete and to put the right man in the right place is most essential in every industry. Quality and production will suffer where frequent changes occur and to "break in" a new man means much spoilage and considerable expenditure of money.

Foremen can do very much toward a better understanding and creating a spirit of loyalty and co-operation. Furthermore, they can educate the help to save materials and prevent willful waste.

A suggestion system is a great aid in the elimination of waste and reduction of production costs. Suggestion sheets should be distributed throughout the plant and rewards offered according to the merits of the suggestion. It will be noticed that surprisingly many suggestions about handling of materials, improvement on equipment and stoppage of leaks and losses come from men in the mill.

Safety

Safety devices play a larger part in the elimination of industrial waste than is generally apprehended, but statistics show that economical losses from accidents and their consequences reach annually staggering figures. In removing hazards and improving working conditions, much of this waste can be prevented. Intelligent safety work, properly organized and carried out, pays in economic as well as humane returns and neither employer nor employee can afford to ignore or neglect so consequential a factor.

No plant is, nor will be entirely free from leaks and losses through waste. A carefully evolved system of investigation, however, may point the way toward improvements and turn waste into profits.

The Treatment of Boiler Feed Water

Artificial Zeolite Systems and Evaporating Methods—Part III

By ROBERT JUNE, M. E.

OUR preceding articles have dealt with the various impurities in boiler feed water, the resultant operating troubles, and we have also considered the use of boiler compounds, boiler metal treatment and water softening plants, as a means of overcoming our difficulties. Several important methods of water treatment have yet to be considered.

The Zeolite Water Softening Method

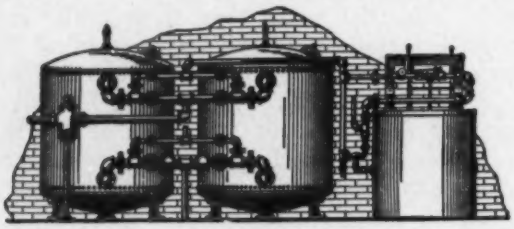
All of the troublesome calcium and magnesium in boiler feed water may be removed by passing the water through a bed of zeolite. Zeolites are silicates which possess the valuable property of effecting a rapid exchange of the sodium, which they contain, for calcium and magnesium in the water. As hard water comes in contact with zeolites this exchange takes place instantaneously, harmless sodium salts being formed and the hardness remaining in the zeolite. The action is a chemical exchange and takes place in the cold. There is, of course, a definite limit to the quantity of sodium and magnesium in the water, this limit depending upon the total amount of exchangeable sodium in the zeolites, which is regulated by the sizes of the zeolite bed.

When the limit of exchange has been reached, the zeolite bed is regenerated by passing through it a brine composed of common salt. As the reverse of the softening exchange takes place, sodium replaces the absorbed hardness and the hardness forming constituents are carried off to the sewer as a clear solution. The zeolite bed is then ready to treat another batch of hard water. As the exchange involves no loss of the zeolite, the same bed may be used for an indefinite number of years without the addition of a new supply of zeolite.

The use of zeolites for softening water for industrial and domestic purposes was introduced in the United States about ten years ago by the Permutit Company, who use the trade name Permutit in marketing their various products.

The 200,000-gallon Permutit Water Softening and Clarifying System of a manufacturer in Rensselaer, New York, which operates on a four grain water from the Hudson River

The design of any particular zeolite system will, of course, depend upon the chemical composition of the water to be treated and the maximum hourly and total daily amounts. The area and depth of the zeolite bed must therefore be determined in each individual case after the water has been analyzed and the desired capacities determined. Many other factors are also involved as zeolite equipment is frequently installed in combination with other apparatus, such as iron removal apparatus, aerators, lime-soda pretreatment apparatus, etc., depending upon the amount and variety of impurities that it is desired



A Borromite 2-Unit 24 hour, continuous service type softener

to remove from the water, and other operating conditions.

In the main, however, satisfactory operation is obtained through the use of a zeolite water softener alone. The rate of softening through zeolite bed is normally about the same as through a rapid sand filter, and in the case of fairly soft waters it may have as much as double this rate, for the reason the equipment takes up a comparatively small amount of floor space in proportion to the quantity of water handled.

In the design of this equipment the water is passed through the zeolite bed. Operating valves are provided so that during the process of cleaning and regeneration the flow may be reversed, thus thoroughly loosening and carrying off all sediment that has been deposited in the zeolite bed during the process of softening as well as the calcium and magnesium impurities that are removed by the regeneration process. These impurities are all discharged to the sewer and by reversing the flow in this manner any tendency to form channels in the zeolite bed is removed.

When continuous night and day supply of water is desired it can be accomplished either by arranging for storage of the softened water or by means of the two zeolite softeners in parallel which permits the regeneration of one while the other is softening water.

The regeneration is accomplished by introducing into the water softener a brine solution that contains exchangeable sodium in excess of the amount of calcium and magnesium that is to be removed from the zeolite bed. This solution percolates through the zeolite bed forcing out the calcium and magnesium to the sewer and continuing until all particles of zeolite have been regenerated. The length of time required for regeneration is governed by operating requirements as it may be accomplished in twenty to thirty minutes, or over a period of six hours or more.

If a single zeolite softener unit is operating on a ten-hour day it can be most advantageously regenerated by occupying the idle time over night, as it is obvious that the more slowly a zeolite bed is regenerated, the more completely this function will be performed. If there are two softeners in operation, working alternately, the period of regeneration is best arranged to occupy the full softening period of the unit that is in operation. For further operating conditions, other periods of regeneration may be most suitable, it being kept in mind that the longest periods of regeneration give the best results.

Because of its positive character and its flexible adaptability to all operating conditions, zeolite water softener offers a real solution to feed water problems. Boilers and auxiliary apparatus, fed with zeolite softened water, are found to be maintained permanently clean. Zeolite water softening apparatus, because of its simplicity and automatic features, is the cheapest commodity existing, its cost for regenerating purposes is equally low per thousand gallons of water softening. It has been shown that a return of 50% on the investment may be expected from the average zeolite water softening installation for boiler feed purposes and there are many recorded instances of installations in textile mills, paper mills, laundries, soft drink manufactories, canning factories, etc., in which the softened water is used for manufacturing processes, where investments in zeolite equipment have made a return of several hundred per cent. For this reason and because of the large amount of capital that is necessarily tied up in boilers and auxiliary equipment, it may be seen that the consideration of zeolite water softening apparatus may prove to be a very profitable move on the part of the manufacturer.

Zeolite Plants from an Investment Standpoint

The figures in Table I have been tabulated for a small steam plant operating three 200-H. P. boilers, average load 500 B. H. P., peak load 750 B. H. P. Make-up amounts to 50 per cent of the total boiler feed. This data is from average figures based on the experience of Borromite users. Make-up amounts to 50 per cent of the total boiler feed.

Table I

(Coal at $5.00 per ton in the firebox)

Cost of Operation with Scale

1.—Make-up water is 12 grains per gallon in hardness. Scale in 3 weeks is 7/64 in. thick—average about 1/16 in.; loss in heat is 10 per cent. Boilers opened for cleaning and inspection every 3 weeks.

2.—One of the 3 200-H. P. boilers is cleaned

each week. Labor cost of 2 men 2 days at $5.00 per day per annum..... $1,040.00
3.—Coal for heating the water drained out of boiler and that to fill boiler after cleaning —¼ ton x 52 weeks x $5.00—per annum 65.00
4.—Investment in a boiler and stoker, $5,000.00. Since a boiler is out of service 2 days each time it is cleaned, this means with 3 boilers there are 104 days one is out of use in a year ($5,000.00 x 7 per cent x 100, divided by 365 equal interest loss on investment)..... 99.00
5.—Excess blow-down over normal, to eliminate sludge from use of boiler compound, and hard water is two gauges extra per day or 310 gallons total for 3 boilers. (310 gal. x .3 lb. x 210 degrees rise in temperature x 365 days x $5.00) divided by 8,400 B. T. U. per lb. of coal x 2,000 lb..... 58.70
6.—New tubes, 12 per boiler, or 36 at $1,000.00 per annum..... 360.00
7.—Coal, 1,400 tons at $5.00 per annum.... 7,000.00

Total $8,622.70

Summary

Cost of operation with scale....	$8,622.70	
Cost of scaleless operation.....	6,416.50	
Gross annual saving.....		$2,206.20
Cost of Borromite Softener for plant of this size.....	3,000.00	
Interest and depreciation at 15 per cent	450.00	
Cost of operation, 26 tons salt at $10.00.....	260.00	
		710.00

Cost of Scaleless Operation with a Borromite Water Softener

1.—Make-up water is 0 grain per gallon in hardness. No scale is formed. Boiler is opened for inspection once every week for 12 weeks.
2.—No scale, no labor cost for cleaning per annum $0,000.00
3.—Coal for heating the water drained out of boiler and that to fill after inspection —¼ ton x 12 months x $5.00 per annum 15.00
4.—Investment in a boiler and stoker, $5,000.00. Since a boiler is out of service one day each time it is inspected, this means with 3 boilers there are 12 days one is out of use in a year ($5,000.00 x 7 per cent x 12) divided by 365 equals interest loss on investment..... 11.50
5.—No excess blow-down with clean, soft water ....
6.—New tubes, 3 per boiler, or 9 at $10.00 per annum 90.00
7.—Coal, 1,400 tons—10 per cent (140 tons) or 1,260 at $5.00..... 6,300.00

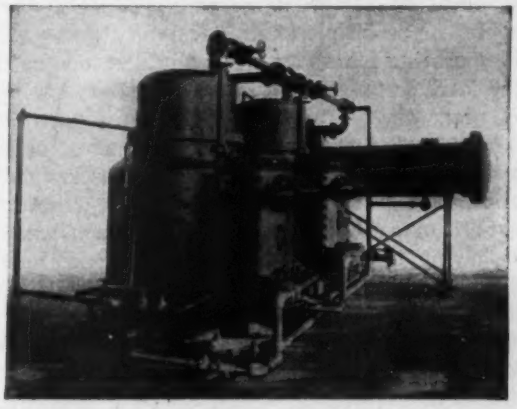
Total $6,416.50

Summary (Continued)

Gross annual saving	$2,206.20
Less interest and operating charges.....	710.00
Annual "Pay Balance" net.....	1,496.20
Return on investment softener.....	50%

Distilling Plants and Evaporators

Distilled water for boiler feed is in successful use in many power plants. It is first produced by vaporizing the raw water in an evaporator, and then passing the steam to a condenser, or preferably into the boiler feed heater, where it is condensed by means of the feed water entering from the main power plant condenser.



Griscom-Russell High Heat Level Evaporator Plant Simple Two Effect

The Reilly Submerged Type Evaporator consists essentially of a closed shell for holding the raw water, into which are introduced a number of steam coils. Live steam from the boiler, sometimes at reduced pressure, or auxiliary exhaust steam, is passed into the coils where, upon condensation, it gives up its latent heat to the raw water, thus vaporizing the raw water.

In order to effect greater economies in operation, "double effect" distilling plants are frequently used. In this type of plant steam from the "first effect" evaporator is condensed in the heating coils of the "second effect" evaporator, the vapor from the "second effect" evaporator being condensed in the usual way.

As a matter of general practice, it will be found that the production of the "single effect" distilling plant is approximately one pound of distilled water for one and two-tenths pounds of steam supplied to the evaporator coils, whereas the "double effect" distilling plant will produce about one puond for each seven-tenths pound of steam supplied to the "first effect" evaporator coils.

Therefore, in choosing between the "single effect"

evaporator and the "double or multiple effect" evaporator, consideration must be given to these facts.

As a matter of general practice, it will be found that the production of the "single effect" distilling plant is approximately one pound of distilled water for one and two-tenths pounds of steam supplied to evaporator coils, whereas the "double effect" distilling plant will produce about one pound for each seven-tenths pounds of steam supplied to the "first effect" evaporator coils.

Therefore, in choosing between the "single effect" evaporator consideration is to be given to first cost on the one hand, and to the economies effected by the use of the compound equipment on the other. From a dollars and cents standpoint it is usually more economical and better engineering practice to use the "double" or "multiple effect" system.

Evaporating plants are generally designed as "low heat" level or "high heat" level. In the "low heat" level plant the evaporators may be operated with boiler steam at full or reduced pressure, or with auxiliary exhaust steam at a pressure as low as two pounds. The latter installation, where auxiliary exhaust steam is used, is apt to be quite expensive, however, owing to the large amount of steam handled and to the fact that evaporation must take place under a vacuum, thus requiring vacuum pumps, etc.

The "low heat" level evaporator is usually preferable where economizers are used, and it may also be a profitable investment where there is considerable auxiliary exhaust steam.

Where there is say ten per cent or more of make up water required and where economizers are not used, it will generally be found that the "high heat" level evaporating system is the most satisfactory and economical. As the name indicates, evaporation in this system takes place at comparatively high temperatures and pressures. As the steam consequently passes from the evaporator at high temperatures, it can be condensed in a condenser, using circulating water at correspondingly high temperature.

In the Griscom-Russell Company's "high heat" level condenser the boiler feed is pumped from the boiler feed heater through the "high heat" level condenser or condensers, on its way to the boilers. Drains from the "high heat" level condenser and from evaporator coils are passed to the boiler feed heater. With this system the boiler feed water reabsorbs all heat given up in the evaporating coils with the exception of the small amount lost in radiation and the evaporator blow-off.

Distilled water is, of course, of zero hardness and its use assures the absolute elimination of any impurities in the feed water, so that exceedingly high boiler ratings can readily be obtained and consistently maintained by the use of distilled feed water.

The analysis in Table II of probable savings in plant operation by use of evaporator system is based on figures supplied by the Griscom-Russell Company.

Table II

Net hourly evaporation, 150,000 lbs.

Net hourly boiler feed make-up, 15,000 lbs.

Net hourly boiler blow (without evaporator system), 7,500 lbs.

Boiler steam at 200 lbs. gauge, saturated.

Hot well temperature, 90° F.

Raw water which would be used for evaporating feed 60° F. (Brackish).

Auxiliary exhaust steam, 13,600 lbs. per hr. at 0 lb. gauge.

Boiler evaporation, 9 lbs. of steam to 200 lbs. gauge per lb. of coal (useful heat per lb. of coal equals 10,513 B. T. U.).

Cost of coal, $4.00 per 2,000 lbs.

Cost of present make-up water $1.00 per 1,000 cu. ft. (purchased from Public Water Works) 63°.

Boiler Blow

Will be practically eliminated; savings per year,

$$\frac{7{,}500 \times 330 \times 8{,}760 \times \$4.00}{10{,}513 \times 2{,}000} = \$\ 4{,}124.00$$

Boiler Tube Heat Transfer

Will be increased sufficiently to save approximately 5 per cent of coal bill; savings per year,

$$\frac{150{,}000 \times 8{,}760 \times 05 \times \$4.00}{9 \times 2{,}000} = \$14{,}600.00$$

Boiler Take Down

Will be largely eliminated; estimated savings per year 1,000.00

Boiler Maintenance

Tube replacements, etc., will be greatly reduced; estimated saving per year... 500.00

Cost of Present Make-up Water

Will be eliminated; saving per year,

$$\frac{15{,}000 \times 8{,}760 \times \$1.00}{62.5 \times 1{,}000} = 2{,}100.00$$

Total yearly savings in plant operation..$22,324.00

Charges Against Evaporator System

First Cost

Approximate total cost of Evaporator System, including piping, lagging and erection $26,900.00

Radiation

Approximate total radiation surface, 800 sq. ft. Assuming radiation, 60 B. T. U. per sq. ft. per hr. Heat losses per hr., 800 x 60, 48,000 B. T. U.

Evaporator Blow

With the system proposed, evaporator blow will be about 2,500 lbs. per hr. at 212° F. (temp. of raw feed 63°). Heat losses per hour, 2,500 x 149, 373,500 B. T. U. Total heat losses per hr.,

421,500 B. T. U. Cost of these losses per year,
421,000 x 8,760 x $4.00

10,513 x 2,000.....	703.00
15 per cent per year on $25,900.....	4,035.00
Yearly labor charges for evaporator system	1,000.00
Total yearly charges against evaporator system .....$	5,738.00

Conclusions

Total savings in plant operation per year	22,324.00
Total charges against evaporator system per year	5,738.00
Net yearly balance.....$	16,586.00

A Wasteful Policy

By B. T. McBAIN

THERE are some things about the wrapping paper business, in my humble opinion, that are wrong, radically wrong. Abuses crept in when manufacturers were hungry for business and later they wonder why they were so weak as to allow them to do so.

Most wrapping mills now deliver sheet papers at the same price as counter rolls, yet the sheet paper costs them from 5% to 10% more than rolls. Many mills today are losing money on every pound of sheet wrapping delivered, yet they seem backward or afraid to make their price enough higher on this item to come out even. It was a mistake in the first place to put the sheet price on a par with rolls, and it is now a mistake not to come back and demand the correction of the original error.

One salesman says, "If I increase my price on sheets, I'll lose all my sheet business." What is the difference if you do lose it when you are losing money? But I do not think the mills will lose their business. Some other mill owner might not change his price and might get all the sheet business. He can have it all if he wants it, I would say, but when he is filled up with sheets, he cannot make rolls and someone must make the rolls. Why not be that someone?

The consumer knows there is something wrong. He thinks the way prices are now that the manufacturer or the jobber from whom he buys is overcharging him on rolls, rather than the manufacturer losing money on sheets. Anyway he would rather believe the one condition existed than the real one. Why not correct the error and these wrong impressions? It has to be done some day. Why not now?

The other great abuse is, light weight papers taking the place of the heavier weights and the foolish precedent set by some one or two Kraft manufacturers in making the same price for 25 lb. No. 1 Kraft as for 30 lb. and heavier weights. The manufacturer who accepts 25 lb. orders for the same price as 30 lb. is losing money; he cannot refute that statement. He may be making a profit, but he is losing money. If he can make, on a certain machine, 30 tons of 30 lb. paper at maximum speed, he cannot hope to make over 25 tons of 25 lb. If his profit is $10.00 per ton on the 30 lb., his mill shows a profit of $300.00 per day, but if he makes $10.00 per ton on the 30 lb., he cannot hope to make that much on the 25 lb. because the conversion cost and overhead is the same in dollars and cents for that machine day on the 25 lb. as on the 30 lb., and his profit is surely cut to $5.00 or $6.00 per ton. But, consider that the profit is the same as on 30 lb., the income is only $250.00 per day, showing a loss of $50.00 per day without any greater manufacturing cost or lower efficiency on the paper machine production. There is a difference in cost, however, in most mills of around $10.00 per ton between 25 lb. and 30 lb., and the manufacturer who cannot see this, in my opinion, is blind, or his cost system is wrong. If he can see it and does not try to correct the error, he is harming the industry.

Light weight papers in Kraft 15 lb., 18 lb., 20 lb. and 22 lb. have killed the wrapping paper business generally and the sulphite wrapping paper business particularly in many localities because the Kraft manufacturer has been too hungry for business.

It would be better for the Kraft wrapping paper business generally and for each single manufacturer if all these light weights were discontinued. The consumer would get better paper, the consumer's customers and product would be better protected, and the paper manufacturer would get greater production out of his machines at greatly reduced cost and greater profit than he can ever expect to do manufacturing "tissue paper" for wrapping paper at a small additional price over and above legitimate weights.

My own interests are the same as the others. I am not criticising others any more than our own firm which is forced to follow in the footsteps of the larger producers if they expect to continue in the game.

However, if those with stiff vertebrae would only wake up and stand for their rights, again the weak ones would soon be full of the unprofitable business and customers would then come to the manufacturer's way of thinking and buy what he can afford to make, giving him a legitimate profit for a legitimate product.

This waste of machinery, time, effort and money is as bad in my opinion on the part of the management and sales department as the same amount of dollars and cents going down the sewer in the production department. One mill man says it is conserving our forests and prevents waste to make light weight papers do the work of the heavier variety, but when so-called conservation makes waste, it is not conservation at all.

The Wear of Paper Machine Wires

By V. BOUYER*

Translated from "Le Moniteur de la Papeterie Fraançaise," liii, 391-393, Aug. 15, 1922
By A. PAPINEAU-COUTURE

ONE OF the main causes of the deterioration of paper machine wires is the wear caused by friction of the paper or under side of the wire against certain parts of the machine.

There is friction, and consequently wear, wherever the moving wire comes in contact with some part which has not the same velocity as the wire. For instance, when the wire travels over a table roll which turns perfectly true and with practically no friction in the bearings, it does not slide on or rub against the roll and there is no wear; for the slight amount of work required to keep the table roll turning can be neglected.

Circumstances Causing Friction

Rotating Parts.—Suppose that the table roll which we took as example does not turn freely and true, the wire will rub against it in trying to make it turn. The tangential velocity of the roll is less than that of the wire, and the friction will be proportional to the difference between the two velocities.

What we have just said of the table rolls is equally true of all rotating parts of the table, which, except the couch roll, which is driven mechanically, are driven by the wire itself. In the case of heavy parts such as the stretch rolls, the friction can be quite considerable and becomes apparent on the upper side of the wire where the bends in the warp wires are worn down.

As to the breast roll, we need not consider it, for the angle of contact with the wire is so great that it is hard to conceive of the wire sliding at all, no matter how great the effort required to make the roll turn. The accident which would befall the wire would be of an entirely different nature, namely, stretching out, longitudinal creasing, or tearing.

Fixed Parts—Suction Boxes.—Here it is impossible to avoid friction, as the rapidly travelling wire is drawn right up against the top of the box by the suction. In order to reduce wear as far as possible it is advisable to take the following precautions:

1. Cut down as much as possible the suction at each box;
2. Use wooden lips instead of metal ones, and dress them as often as possible;
3. See that the weight of the dandy does not cause the wire to make an angle as it reaches the lip of the following suction box;
4. Bring the suction boxes as close to one another as possible, even putting them right up against one another.

A certain number of other means have been tried, and it is certain that everything which reduces the slipping of the wire on the various parts of the machine will increase the life of the wire.

Accidental Causes.—What we have just said has reference to normal operating conditions. We have shown that a little care or carelessness can affect the life of the wire very appreciably. We shall now look into several of the accidental causes of wear, which we consider should be greatly reduced and even completely eliminated. They are due to improper mechanical conditions which have a most disastrous effect on account of the shake of the table.

The shake is necessary in order that the fibers may felt properly and it need not have any harmful effect on the life of the wire if proper precautions are taken. We will go even further and say that complete elimination of the shake presents a serious danger for plain weave wires. But we shall refer to this again further on.

It is evident that the greatest amount of shake is at the breast roll, and that the amount decreases as we go towards the fixed rails. If every part of the machine is in theoretically perfect mechanical condition, when the wire reaches the stationary rails it should continue in a perfectly straight-line path without any lateral motion. This state of affairs is very rarely to be found, and moreover it is not desirable.

The shake rails and stationary rails usually meet very near the first suction box (Case I), or about 1 or 2 meters away from it (Case II). The table rolls of the stationary part of the table are generally larger than the other table rolls.

Effects on Wire

Case I: The shake and stationary rails meet very near the first suction box.

There is a large amount of shake, and owing to improper care of the machine, which we shall describe further on, the wire is still swaying considerably when it reaches the first suction box, sometimes as much as 4 to 8 mm. It is evident that the friction due to this lateral motion adds itself to that due to the regular forward motion of the wire and considerably increases the amount of wear. Each point of the wire, instead of describing a straight line in passing over the suction box, describes a wavy line which can easily be traced if we know the amount of sway of the wire at this point, its speed and the frequency of the shake. The increase in the length of the path can be from 10 to 25% greater than that of the straight line path, which causes a proportional and absolutely needless increase in the wear of the wire.

*Manager of the wire cloth factory of Rai-Tillières, France.

And what happens at the first suction also happens (though with gradually decreasing intensity) right up to the last suction box where the side motion is still greater than it should be.

There is little or no shake. The wire has no side motion as it passes over the suction boxes. This is equally dangerous, but in a different way. As the warp wires practically always pass over the same points of the boxes, they very soon groove the latter and then travel in the grooves which they have made and which absolutely prevent any side motion. The wear of the individual warp wires does not occur on a plane surface but on a very characteristic prismatic surface. But the seam wires, which were purposely placed between the warp wires so as to protect them from friction and consequent wear, are no longer protected. The projections between the grooves in the top of the suction boxes are necessarily between the warp wires and wear out the seam wires, causing the seam to tear prematurely.

There are but two remedies to this defect: use wires which do not run straight on the machine—that is, which either purposely or accidentally are not perfectly woven; or else give a slight shake which will be very lightly felt at the suction boxes.

Premature ripping of the seam due to grooving of the suction boxes has occurred especially on news print machines which had little or no shake.

Case II: The shake and stationary rails meet at some distance from the first suction box.

There is a large amount of shake and the wire has considerable lateral motion when it comes to the stationary rails. If the rolls which are supported by the fixed rails do not have any side play the wire will rub on them, so that it is necessary to give them just a little play. They will then be carried to and fro by the side motion of the wire, which gradually dies down so as to be very slight at the first suction box.

If there is but little or no shake, the wire will be traveling absolutely straight when it reaches the suction box and the same thing will happen as was described above in Case I.

Breast Roll, Table Rolls, Stretch Rolls

It is absolutely necessary that all these rolls should have no play in their bearings. Unfortunately very often such is not the case, and very frequently the breast roll bearings are so constructed that it is not easy to detect play.

Breast Roll: It sometimes happens that the breast roll has 6 to 10 mm. of play and is thrown this amount to each side at every shake of the machine, and it naturally carries the wire with it. The displacement of the wire is therefore equal to the sum of the displacement of the table and of the play of the breast roll. As the table rolls do not generally have such a large amount of play, it follows that the wire rubs on each one of them and wears out, as we have seen it do at the suction boxes. Owing to the large number of table rolls this cause of wear is far from negligible. Moreover, the change in direction of the motion of the shake proper takes place smoothly; but the play of the breast roll makes it jerky and tends to disrupt the weave of the wire.

Table Rolls: On most machines these rolls are not quite snug in their bearings, and the shake throws them from side to side causing friction with the under side of the wire which has but the motion due to the shake if the breast roll has no play. These conditions can very easily be remedied, even if the machine builder has not provided any special means to this end, by slipping one or more washers on the journals of the rolls.

Stretch Rolls: All that we have already said about the breast and table rolls holds equally well for the stretch roll. The wear due to this roll can usually be detected quite easily, for if the upper side of the wire is worn it can be due only to the rolls in the immediate neighborhood of the stretch roll, which are the only parts of the machine which come in contact with the upper side of the wire. At times it is quite appreciable and is increased if any of these rolls play in their bearings.

In some modern machines the breast, table and couch rolls are mounted in ball bearings so as to decrease the work required of the wire in driving them. This improvement is very wise and cannot help but give excellent results provided the bearings are kept in perfect condition. We make an exception, however, for the rolls of the stationary part of the table, which should have a slight play, as explained above.

Return Rolls: We shall finally say a word of the return rolls. Theoretically the roll directly under the junction of the shake rails and stationary rails can be bolted to the ground. At this point the wire is free from lateral motion; but the rolls from this point to the breast roll should form part of the movable part of the fourdrinier and the displacement of the wire gradually increases from this point to reach a maximum at the breast roll. This is the usual arrangement; but in some machines there is a fixed return roll much closer to the breast roll than the end of the shake rails, while the next return roll is attached to the movable part of the table. The wire is therefore obliged to pass from a fixed roll to one which has a considerable shake and which is but 1.5 to 2 meters away. It naturally follows that the wire is under a considerable dislocating strain, and if the shaken roll plays in its bearings the wire works under exceptionally hard conditions which cannot but greatly shorten its life.

We hope that the foregoing discussion will draw the attention of both paper makers and paper machine builders to the necessity of co-operation on their part so as to obtain maximum economy under working conditions.

Pointers for the Engineer

By W. F. SCHAPHORST, M. E.

Van Stoning Wrought Iron Pipe

IN THE July number of THE PAPER INDUSTRY I made a misleading statement, which must be corrected. I said that wrought iron pipe cannot be successfully Van Stoned, and by means of a sketch I showed the "sunflower" effect that usually results when an effort is made to Van Stone such pipe. One of the prominent manufacturers of GENUINE wrought iron pipe read the article and I have been justly criticized because of what I said.

Because of the fact that the writer himself did not know that even GENUINE wrought iron pipe is being successfully Van Stoned, I believe that further comment on the subject will be interesting to paper mill engineers, particularly since I have made an investigation by making inquiries of the leading concerns in the United States who do Van Stoning work.

There Is a Difference

In the July issue I had reference only to the ordinary brand of wrought iron pipe and did not mention GENUINE wrought iron pipe. My statement would have been correct had I specifically stated "ordinary wrought iron pipe," and therein I erred.

Even after investigating the matter I now learn that all concerns do not Van Stone even GENUINE wrought iron pipe, and it apparently requires a special process that is either too tedious for most of the manufacturers or is not known to them. I have not been able to learn just what the process is. Possibly it requires the usage of a considerably higher heat during the Van Stoning process to prevent splitting at the ends due to the fibrous nature of wrought iron.

By way of explanation it so happens that the writer was not long ago employed by a large engineering concern that makes a business of large power plant piping contract work in whose offices and shops the matter of Van Stoning wrought iron pipe was often discussed and was just as often dismissed as being impractical. To make certain that I was either right or wrong, however, I wrote letters to a number of responsible concerns throughout the country who do work of this nature and received replies of which the following are excerpts:

Seven Say "No"

Concern No. 1—"Wish to advise that it is impossible to make a satisfactory job on lapping wrought iron pipe."

Concern No. 2—"Would advise that wrought iron pipe for Van Stoning is entirely unsatisfactory."

Concern No. 3—"We would not recommend Van Stoning wrought iron pipe."

Concern No. 4—"Regarding Van Stoning wrought iron pipe, we presume you refer to GENUINE wrought iron pipe, and in such event beg to advise that to date we have been unsuccessful in making a TRUE Van Stone end on such material.

"We have Van Stoned GENUINE wrought iron pipe where permission has been given us to weld up electrically or by the oxyacetylene process the radial fractures which develop in Van Stone processing such material. While not provided by ourselves, we have knowledge of instances where steel pipe stub ends were welded onto GENUINE wrought iron pipe, and the stub ends Van Stoned."

Concern No. 5—"Beg to advise that wrought iron pipe cannot be successfully Van Stoned. We have had about 20 years' experience Van Stoning and find that when it is attempted to Van Stone wrought iron pipe that the same will split in hundreds of places, and one trial will be sufficient to show you that the process cannot be successfully employed."

Concern No. 6—"We have conducted quite a number of experiments in trying to Van Stone wrought iron pipe and none of which have ever proven satisfactory. We, therefore, are not in position to recommend its use.

"We do not know of anyone in this line that has successfully invented a method of doing this, but we do know that a number of manufacturers are taking rings and welding to the end of wrought iron pipe and calling it Van Stone. We do not recommend this practice and therefore would not advise the use of Van Stone joints on wrought iron pipe."

Concern No. 7—"We believe you have reference to GENUINE wrought iron pipe, and on this subject refer you to the attached photograph showing what usually happens when GENUINE wrought iron pipe is lapped or flanged. (This photograph was very similar to the sketch shown in the July PAPER INDUSTRY.) For the reasons illustrated in the photograph we do not recommend Van Stoning GENUINE wrought iron pipe. The splitting of the lapped-over portion of the pipe in the flanging process is due to the fibrous structure of GENUINE wrought iron pipe. These fibers, of course, run lengthwise with the pipe. Some manufacturers lap GENUINE iron as well as steel pipe, and we believe the general practice is after lapping to weld the split portions of the lap, which we do not believe to be good practice so far as GENUINE wrought iron is concerned."

Two Say "Yes"

Two of the concerns replied that they can successfully Van Stone wrought iron pipe, as follows:

"After considerable study we are able to Van Stone satisfactorily GENUINE wrought iron pipe. We have furnished several jobs this current year."

Another concern said practically the same thing, and I wrote to the latter concerning the comparative cost of Van Stoning wrought iron pipe versus Van Stoning steel pipe, and they replied as follows:

How Much Does it Cost?

"The cost of Van Stoning wrought iron pipe by our method is about double that of Van Stoning steel pipe."

In replying to this letter, I inquired as follows:

"In your Van Stoning of wrought iron pipe do you tip the pipe with steel, or is it GENUINE wrought iron throughout? If genuine wrought iron, do you find it necessary to do any subsequent welding to weld up the cracks?"

To this they replied:

"When we Van Stone genuine wrought iron pipe all of the pipe is genuine wrought iron, including the lap."

In addition to the above the writer has seen numerous catalogs published by piping concerns in which it is prominently printed that wrought iron pipe cannot be Van Stoned. Apparently, most of these include in their claims both ordinary and GENUINE wrought iron. The writer had never before seen the statement made that GENUINE wrought iron pipe can be Van Stoned and he has learned something. He trusts that the above now clarifies this important matter, that there will be no further question about it, and that no damage has been caused in any way.

Regarding Corrosion

I also made the statement in the above connection that wrought iron pipe has little if any advantage over steel pipe as regards corrosion, and the same manufacturer of genuine wrought iron pipe criticized me because of this statement. The manufacturer wrote as follows:

"We were very much surprised to note on page 536 of THE PAPER INDUSTRY for July, 1922, the statement that genuine wrought iron pipe cannot be successfully Van Stoned, and also that 'wrought iron pipe has little, if any, advantage over steel pipe.'"

Genuine Wrought Iron is Better

It is doubtless true, and I was aware of the fact at the time of writing the July article, that GENUINE wrought iron pipe is very much superior to ordinary steel pipe and ordinary wrought iron pipe as regards corrosion. There is no question about that.

It is the consensus of opinion of most engineers in the piping business, known personally by the writer, that ordinary wrought iron pipe has little if any advantage over steel pipe. Wrought iron pipe for instance, is more difficult to thread. Because of its fibrous nature it is liable to split, and, for that matter, steel pipe is also liable to split, but the possibility is uniformly less than with wrought iron pipe. And as for corrosion, the writer in his own experience has not been able to notice any difference, nor were our field men able to notice any difference. The effect of corrosion is generally more severe from the inside of the pipe than from the outside, and much, therefore, depends upon the liquid or gas that is piped. In some cases the ordinary wrought iron pipe is more easily attached than steel.

For resisting corrosion GENUINE wrought iron pipe is, without question, vastly superior to both ordinary wrought iron pipe and ordinary steel pipe and is recommendable for use in the paper mills where great durability is desired.

The Sacred Wrought Iron Pole

A number of years ago I read a very interesting booklet on a peculiar looking pole somewhere in the Orient that is said to be many hundreds of years old. It is made of pure wrought iron—in other words, GENUINE wrought iron. It is so durable and unchangeable that the natives of that and surrounding countries make lengthy and costly journeys for the sole purpose of worshiping it. To them it is sacred. To be sure, this writer cannot vouch for the pole, but the story sounds plausible.

Is There a Formula for Inefficiency?

NOT long ago I read a statement worded somewhat like this: "Eighty per cent efficient means 25 per cent inefficient." Is that correct? Are we not generally in the habit of thinking that 80 per cent efficient means 20 per cent inefficient? We simply subtract 80 from 100. The writer of the above statement evidently desires to show us that we are wrong, and that wastage is greater than we suppose. His formula seems to be

$$\text{Inefficiency} = \frac{100 - \text{efficiency}}{\text{efficiency}}$$

But let us see. Let us substitute an efficiency of 50 per cent in his formula. We then get

$$\frac{100 - 50}{50} = 100 \text{ per cent inefficiency}$$

Now, 100 per cent inefficient, I should say, means that "all is lost," and that the efficiency is zero instead of 50 per cent. It is true that where boiler efficiency is 50 per cent, for example, just as much heat is lost as is utilized. The amount of fuel burned is twice as great as it would be with 100 per cent efficiency. Or, if 100 per cent efficiency were possible, the fuel bill would be cut in half.

I conclude, therefore, that the writer of the above statement was a wee bit too eager to point out the

seriousness of losses. He tried to make them look as big as possible via the mathematical route. In an extreme case, where the efficiency is 1 per cent, his method would give

$$\frac{100 - 1}{1} = 9{,}900 \text{ per cent inefficiency}$$

In my mind the logical formula for inefficiency (if inefficiency can be stated as a percentage) is:

100 — efficiency = 100 per cent inefficiency

Cost of Blowing Soot

THE writer has done a little figuring on the cost of blowing soot from the boiler tubes on the assumption that with the soot blower installed 6 lbs. of steam are generated per pound of coal, and on the further assumption that a ton of coal of 2000 lbs. cost $5 per ton. On that basis the cost of blowing the soot, at each blowing of 3 minutes duration, would be as follows:

Initial Steam Pressure Lb. Gage	Cost for Cleaning
150	$ .96
200	1.42
233	3.60
235	3.70

Often, however, three cleanings are required per day where soft or very sooty coal is burned and in that case the cost of blowing off the soot per day of 24 hours would be approximately:

Pressure Lb. Gage	Cost of Cleaning	Cost Cleaning per Year of 300 Days
150	$ 2.90	$ 870
200	4.25	1,270
233	10.80	3,250
235	11.10	3,330

To be sure, the number of working days, efficiencies, etc., may be different; but, following this method, and knowing the size of the boiler and the total amount of money spent for fuel per year, it becomes a comparatively simple matter for the boiler owner or the paper mill engineer to estimate with fair accuracy the cost of blowing the soot from his boiler tubes per year.

You may think the boss is pretty near all-powerful. But he isn't. He's as helpless in the hands of Time and Events as you are. Especially is he helpless as to you. Don't think that the boss can make you or break you. He can't. He cannot keep a poor man up or a good man down. He can pile titles and salary on top of a man, but if the man is weak the result will be only a grease spot. On the other hand, the boss may drape overalls and a ten-a-week salary around a fellow, and put him at work cleaning cuspidors, but if the chap has brains and guts he will get the old man's job sooner or later, or some other job just as good.—Making Paper.

Reclaiming Dead Heads

The Nekoosa-Edwards Paper Company, at Port Edwards, Wisconsin, recently took steps to reclaim dead heads from the pond. Since this practice has

been started they have pulled over 600 cords of otherwise waste pulp wood from the pond.

Their method of reclaiming this wood is very simple as is shown by the accompanying illustration. They have found that a man on a raft spearing dead heads is withal very profitably employed.

Half Stuff

In days of old when nights were bold
And ships had wooden decks,
The sailors bold fell down the hold
And broke their bloomin' necks—
And broke their bloomin' necks!

This, however, would not have happened if the National Safety Council had been on the job in days of old.

While on the subject of waste we are reminded of a complaint made by John, the beater engineer. He said his wife had been nagging him to death trying to get some money for a shirt-waist. "The truth," he concluded, "is that I buy my own shirts and I don't waste 'em, either. What business has she sobbing about a shirt-waste?"

We figure that board manufacturers are using so much straw and grass in their business that the cows giving casein are starving to death. As a matter of cruel fact, however, none of the paper men interviewed thus far agree with our theory. The majority still maintain that the casein shortage is due to an increased demand in Kalamazoo for tiddle-de-winks.

Personal Experiences in the Overcoming of Waste

By PRACTICAL MILL MEN

A SHORT time ago we sent letters to a limited number of practical paper and pulp mill men. In this letter we asked for accounts dealing with personal experiences in the overcoming of waste, this being a vital question in the industry. We were not disappointed in the response to these few letters, and are below printing four of these personal experiences touching on the overcoming of waste in varied phases of the industry.

We will from time to time be glad to receive any such experiences of practical mill men. Our only requirement of them is that they deal with a subject that is of vital importance to the industry and offer some constructive suggestions in regard to it. —EDITOR.

Waste

BY MICHAEL LUDWIG AND ROBERT HERRON

Mead Pulp and Paper Company, Chillicothe, Ohio

WASTE in a paper mill begins as the raw materials enter the plant and does not disappear until the finished product has been accepted by the purchaser. The idea that broke represents the waste in a plant is not altogether correct. Broke does represent waste, but only a portion of it. For the purpose of this article we will consider the waste in raw materials and waste in time of men and machinery while engaged in making a poor quality of paper, as well as when broke covers the floor.

It is well just here to mention forcibly that every paper plant is designed to produce a certain quantity of fixed quality paper each 24 hours, which may be termed its capacity production. Anything happening to lower either the quantity or quality of a mill's output is bringing about a very direct waste and consequent loss.

The production of waste will be here considered under the subdivisions of:—

1—Unloading and Storing of Raw Materials
2—Process of Manufacture
3—Inspection
4—Power and Maintenance.

An actual loss in weight occurs for every carload of sulphite, soda pulp, old papers, clay, size, alum, bleach and all other materials that is unloaded at the plant. A much greater loss in quality of these materials is very apt to occur when dirt and perhaps bolts, nails, etc., through lack of care, become a part of the material. These added substances are quite sure to show up later in dirty paper and broken equipment, the result, of course, being rejected paper or lost time due to damaged equipment.

Waste in the manufacturing process shows up at every step. Clay milk may go to the sewer because the screens are stopped up or improperly regulated, or a high or low consistency will cause a change in the weighting of the paper. Incomplete emulsifying of rosin size will show up frequently as spots in the paper, resulting in poor quality and breaks.

Careful sorting of old papers is a tedious task but very essential. If good paper is thrown out a direct waste is the result; if bad paper is allowed to go through the process the quality is affected. Cooking, defibering and washing of old papers is a source of possible excessive loss as in the cases of cookers overflowing and incorrect adjustment of washer weirs when good stock runs to the sewer. Incomplete defibering, irregular quantities of soda ash and bleach will each greatly change for the worse the quality of the product delivered to the beater room.

Indirect Waste in Beating

The opportunity for direct waste or loss in the beater department is overshadowed by the chance for waste in an indirect manner. Here it is a continual effort to keep informed as to the many changes in condition and quality of the various materials delivered to it, with which this department is expected to work up a uniform and standard stock for delivery to the paper machines. Proper condition of fiber, thorough mixing, constant color, correct consistency of stock, as well as exact quantities of materials used in the furnish, must be maintained. Unless the output of the beater room is up to standard it is impossible for the machines to turn out the quality of paper desired, and unless this is accomplished waste in varying degrees is the result.

The machine tender and his crew may be likened to "combat troops" in the army. The entire mill is operated and materials prepared so the paper machines can turn out the required production. Here good stock can be converted into good paper; sometimes stock not so good can be made into paper that will pass inspection. However that may be, it is in the machine room that the mill's reputation is made as to production. Numerous duties fall to the lot of the machine crew,—careful and accurate adjustments must be made and conditions of stock must be continually observed; jordan, head-box, screens and slices, where the final conditioning and delivery of the fiber to the wire occurs, offer chances for good quality, or waste in quality and production. The wire, with its table rolls, guide, deckle straps, showers and dandy, form a unit where can be seen the change from liquid material to the sheet of paper, where also originates a majority of the markings and defects that show up in the finished sheet. With the presses and the felts rests much responsibility for the level and even condition of the rolls of paper. The proper drying of paper is one of the problems in paper making that is always a difficult one and one that is at times the cause of much worry as well as of loss. Excessive moisture or dryness renders paper unfit for use. Machine calendering and winding gains added importance owing to the handling of a nearly finished product. Proper control of the cool air, at times of weights, and speed and accuracy of operators, often mean the difference between paper on the reel and paper in the form of broke.

It is sometimes possible to correct faults in the paper arising on the machines through skillful super-calendering. On the other hand winder wrinkles often change into cuts; hard and soft places, ridges and ropes remain or become worse after passing through the supers. There are plenty of legitimate reasons for waste on calenders without mentioning those of the opposite nature. However, a good run may be entirely upset through allowing a turnover to run through the stack, a wrapped roll may not only lose paper but do damage to the stack that cannot be corrected in many hours, thus losing production, as well as making broke. Low finish or blackened paper is sufficient cause for rejection, entailing consequent waste.

Rewinder Tells the Story

The whole story is told in the rewinder department. It is here that waste and loss show up in their true form. For instance, if the paper is coming good; good stock of good color, clean and free from spots, formation and weight as it should be from the machines, level rolls firm on their cores, no excess trimmer, few breaks and tearouts to contend with, then capacity production has been reached on the machines and supers and will be maintained on the rewinders and only a proper percentage of waste exists. Paper does not always reach the rewinders in this splendid condition, however. It is then that the operator and his helpers can show their degree of skill. Their work is judged according to the finished sets leaving their winder drums. Inspection at this point determines the fate of their output. Much time is consumed in making numerous splices, much waste results from excess width of sheet, rolls slipped on cores must be carefully shifted on backstand, great effort expended in trying to eliminate soft places and such defects, wrinkles must be torn off and sometimes colors must be matched. Such conditions as these mentioned, as well as others, determine much of the waste in this department. Similar difficulties, of course, are encountered in all other departments—they merely appear worse with the rewinders because it is not possible to pass these defects on to some one else,—they must stop here as the paper delivered from rewinders must either be turned into rolls that will pass inspection or become broke, which is largely waste.

If rewinder production drops, as a rule the reason will be found on the supers, on the machines, in the beater room or even beyond in the raw materials. Running speed is essential on the rewinders and this cannot be maintained unless conditions are favorable. As high a degree of skill is required for satisfactory rewinder operation as on other mill equipment. Adjustment of slitters, making of good splices on the back-

side and on the finishing sets, care in using weights when necessary, friction control, correct adjustment of drum speeds, alertness, both mental and physical on the part of the operators—all of these duties and others offer opportunities for skill, the lack of which creates waste in a high degree.

One department in a paper mill which we think sometimes causes us great and unnecessary annoyance and additional waste, but which should and does rank high on the ladder of mill importance, is that of inspection. Inspection and waste are so closely associated it would seem they should work together. Certain standards are set up as to quality and the product must come up to these standards. Paper must be under inspection all the way, so needless work may be dispensed with in trying to finish paper that will never pass final examination. Competent inspection on the machines can be made to cover width of sheet, basis-weight, formation, moisture, scale weight, and condition of roll on winder,—such qualities as it is impossible for ordinary supervision to properly care for and which do, either at that time or later cause more or less waste. Inspection, carefully made on the rewinders, then pretty well ties up the product until a final inspection of finished rolls is made covering also wrapping. Just as inspection on machines saves much endless work, both by man and equipment, in turning back rolls of which it is not possible to make salable paper, on the rewinders it is often possible by the use of good judgment to save time of men and equipment which will more than make up for the loss of a certain amount of paper of questionable quality.

One of the big items of cost and waste encountered in the finishing department is that of calendering and rewinding rolls for a second time. As much time is consumed in performing this operating for the second time as for the first, and is often a needless waste. Much of this additional work can be traced back to such things as pockets in rolls, hard edges, ropes, etc. Recalendering and rewinding a second time will save the most of this paper. However, the cost of this additional operation is lost.

Waste in Moving Rolls

A very exasperating source of pure and altogether avoidable waste of roll paper is brought about by the lack of care in transporting rolls between different departments. It matters not if this is done by crane, truck or otherwise. Unless the same care is used in this duty as is ordinarily used in handling a high explosive, the most needless and inexcusable waste in paper is caused. A very slight bump on a large or even small roll is often sufficient to cause the loss of a sum equal to a man's daily wage. Then when this damaged paper is torn off, perhaps twenty-five pounds more than really necessary may be taken from the roll. There is absolutely no excuse for this source of waste.

In the trucking to and loading of cars for shipment to the purchaser, we reach the point where a sigh of relief is uttered. However, sometimes accidents happen in one or the other of these duties of the shipping department, in which case further waste follows. Final weighing and listing of weights at this point should be very carefully attended to as it is a difficult matter at times to make corrections.

There are two other items coming properly under the head of manufacturing process which are of such importance they must not be overlooked, even though they cannot be distinctly classed as paper making problems.

The necessity of good, steady, reliable power at all times. The energy that will provide constant and never-failing speeds, that all equipment, especially the paper machines, will not vary to the point where different weights of sheet will frequently prevail. Power that will keep the entire mill operating and will not be the cause of partial or entire shut-downs. Power or the lack of it may bring about very great waste in a short time.

Maintenance a Big Item

The second of the two items mentioned is Maintenance of Plant and Equipment. It is impossible to turn out high class paper to capacity unless the manufacturing equipment is in first class condition. The fact that "it will run and make paper" is not sufficient. "It must run to capacity and make high class paper." Paper making machinery is constructed and erected, much of it, on as fine a scale as thousandths of an inch. It is only reasonable to believe that this standard should be maintained just as nearly as is possible. Breast and couch rolls with their bearings, upon which the life and production of wires largely depend, and press rolls, between which the paper is made, of necessity must be round, properly crowned or perfectly straight, as the case may be, and in true alignment, if the best results are expected and waste is to be held down. Rolls have a way of putting up a fine appearance to the eye, but upon being subjected to micrometer calipers show up peculiar defects. The same thing is true of equipment throughout the entire mill, from the covering on the clay screens to the beater roll and Jordan fillings, to the machines, with the dryers and calenders, to the supers, rewinders and on to the save-all coverings. In fact, the whole plant must be kept to a point of high repair in order to assist the operating men in keeping down waste.

Once more attention should be called to the effort toward keeping the mill at capacity production which means full quantity, high quality and low waste. In order to do so we must have good clean material, reliable power, plenty of water, efficient and well kept up machinery, skilled and loyal men rendering whole-souled co-operation.

That "Stitch in Time"

Realizing as I do, the far reaching extent of waste in a paper mill and determined to stop a portion of it at least in our mill, the first thing to be done seemed to be the installing of a system of close inspection covering equipment and the paper itself. This inspection began with everything electrical, three competent electricians being placed on duty as tour workers. During the tour of duty of each man he inspects every motor generator, switch-board, motor and all lights used in operation. Since this plan has been adopted we have no more burned out motors, neither do machine men or calender operators complain that they cannot see clearly what they are doing. This electrician also cares for any emergency work arising during his tour. This arrangement worked so well, I next placed on duty three tour millwrights whose work is also largely that of inspection. Owing to the work of these men many machine shut-downs are avoided, much that would turn into a big job is caught in time to make of it a minor repair. Following this came the placing of an oiler on duty during the day time. This man, besides oiling machinery shafting, etc., inspects belting and pulleys throughout the plant. We have not had a single burned out bearing during the past six months. Much of the work inspected by this man is also looked after by the tour millwright. We believe, however, two sets of eyes are better than one. At the time of the daily wash-up on each machine, of course, the usual careful looking over of the entire machine is attended to. The thought I wish to impress upon every employee in this mill is that inspection does not end with those who are regularly detailed for that purpose, but that every man in the mill should be an inspector of equipment and also of our product.

Our regular paper inspection department under direct charge of the Chief Inspector, begins its duties with tour inspectors on the machines, whose duties make them responsible for the scale weights of paper from the machines, for all records of quality, deckle and general condition of paper and the reporting of any defects to the tour foreman on duty, that corrections may be made immediately. Finishing Room inspectors are continually present in the rewinder department, who inspect all splices made either on back stand or on finished sets of rolls, careful control is exercised over color and conditions of rolls. These men also pass judgment as to whether rolls are to be wound or calendered a second time in the attempt to make salable paper from rolls deficient in certain respects. Final inspection of rolls after having been wrapped but not headed up, is made in the effort to allow none but first class paper to go to the shipping department.

These inspections of paper have brought to my attention a good many chances to correct sources of loss to us, both in quality and broke. We try to standardize wherever possible, especially in minor equipment. Cores and collars represent a large item in cost,—they represent a larger item in broke if not looked after carefully. Specially built trucks, cranes, crane beans and hooks, and benches used to prevent damage to rolls in unloading on the floor effect a saving. Ends of paper pasted down before being taken from machines and calenders to save paper being torn off and carted away as broke also keep quantities of paper on the rolls and out of the broke box.

Daily Report Helpful

No matter how much we do to relieve the waste situation, we find accurate records of our doings must be kept and prepared so as to be available for study each day. Each morning is presented to me what we term our "Morning Report" in which at a glance I have detailed information covering each machine's production of paper and weight of broke for past 24 hours. The same information pertaining to each calender, rewinder and finisher is also shown. I am thus informed why production was high or low and what caused an excess of broke on some certain calender or rewinder and the reason for paper being rejected by the inspection department. Each day reports come to me from our chemical laboratory, which tell me, among other things, just how much money is going to the sewer from the different save-alls in the plant. This is a very real source of waste and one we are particular about in stop-

ping. Our records serve another good cause—each day full records pertaining to each department and each crew are posted in that department so the men responsible for the making of them may see just what they have been doing. We are now keeping records of the life and production per unit of wires and felts on the different machines, expecting ultimately to make a saving in these items. I have begun keeping records of breaks and their causes on the paper machines and believe this will result in information, the use of which will help us to cut down much waste.

Waste is a difficult thing to control, but not nearly so difficult if we have or can get information that will throw some light on the cause. Consequently, I believe in securing all the data possible and going to much trouble to get it, for only by getting to the bottom of difficulties can they surely be eliminated. One more big reason for records is given—When I go each morning to the General Manager's conference I find he has a way of asking questions that can only be answered by one who has this full information in detail.

Improvised Condenser

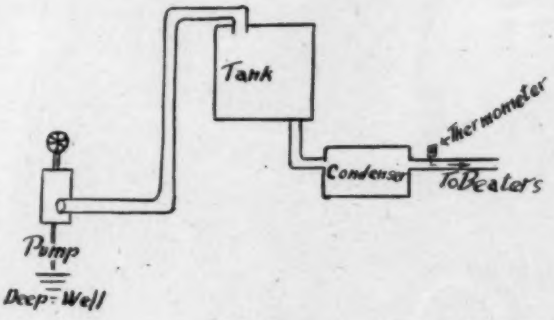
By LOUIS SCHWEITZER

French Process Cigarette Paper Mills, Inc., Jersey City, N. J.

IN a paper plant with which the writer is connected, we have a 250 H. P. steam engine driving our beater room equipment. This engine was run condensing, the cooling water for the surface condenser being supplied by a circulating pond located on the property. Owing to city regulations, we were forced to fill in this pond and to run our engine non-condensing.

As is well known there is about 20% economy in using a condensing engine as compared with the same engine run non-condensing, and we were certainly reluctant to lose this saving. The only solution seemed to be the installation of a cooling tower or spray pond, but upon investigation we found that either of these installations would involve considerable expense.

The writer was about to give up the problem as a bad case, when he came upon an idea which he will now describe in the



hope that it may be of assistance to some plant having a similar difficulty, and which has more exhaust steam available than it can condense in process work.

The water for the beaters and paper machine in our plant is supplied by a deep well from which the water is pumped to a tank about 35 feet above the machine and beater rooms. It was decided to try using some of the well water for circulating water in the beaters.

The calculations necessary are as follows:
Power of engine: 250 H. P.
Water rate of engine: 36 lbs. steam per H. P. hour.
Steam to be condensed in surface condenser: 250x36=9,000 lbs. per hour.

The quantity of circulating water required can be calculated from the following formula:

$$R=\frac{H-h}{tl-to}$$, where

R=pounds of circulating water per pound of steam condensed;
to=temperature of circulating water;
tl=ts—5 (ts=temperature of steam to be condensed);
H=total heat in the steam at ts;
h=heat in the water at tl.

In order to simplify the calculation necessary to obtain R, the following tables may be used.

Vac.	H—h	ts	tl	to=50°	to=60°	to=70°	to=80°
24.0	1012	141	136	11.8	13.3	15.3	18.0
25.0	1017	133	128	12.0	15.0	17.5	20.8
26.0	1022	125	120	14.6	17.0	20.5	25.6
27.0	1028	114	109	17.5	21.0	26.4	35.4
28.0	1036	100	95	23.0	29.6	41.5	69.0
28.5	1041	90	85	29.8	41.7	69.5	209.0
29.0	1049	77	72	47.5	87.0	525.0	.....

Under our conditions we wished to obtain 25 inches of vacuum and to, the temperature of the well water, was 50°; therefore, R=12 lbs. of circulating water, was necessary per lb. of condensed steam.

Water rate therefore per hour: 9,000X12=108,000 lbs. circulating water.

The velocity of the water through the condenser should be such that the temperature of the circulating water coming from the condenser should be not over 80°, as water hotter than this affects the stock in the beaters and on the machine, and tends to make it "free."

A thermometer should be placed in the line to the beater-room as shown in order that temperature of water be known.

Committee Stops Waste

BY LEE L. WILSON

Morris Paper Mills, Morris, Ill.

ABOUT three years ago we formed a club which we termed the Welfare and Efficiency Club, composed of foremen from each department in our mill and box factory and officials of the plant. This club was subdivided into various committees, one especially large committee being the Waste Committee.

Each of the various committees meet separately and the entire club meets twice monthly and reports from various committees are received and talked over. The amount of work that has been done by this Waste Committee, the manner in which our waste has been cut down to a minimum, and the small leaks that amount to a great deal of money in a year that have been closed up entirely, is not only very gratifying but surprising in its greatness. What one man on this committee does not see, some one of the others does, and in the general discussion that follows, many items are covered. Wasted energy, time, steam, heat, stock, water, all things of this nature are watched, and competition among the various departments in the cutting down of waste has resulted in reducing our waste until we feel it is down nearly to a minimum, and we know that hundreds of dollars have been saved by the working of this committee. The club itself has been a medium of closer touch and understanding between the officials and the employees.

This is by no means a new idea, but it has worked out very successfully in our plant.

Getting the Most From White Water

BY ALFRED BRYANT

Bryant Paper Co., Kalamazoo, Mich.

WATER is one of the many problems in paper mills. In the making of paper, water in abundance is very necessary, millions of gallons being used daily in any modern mill. It is vitally important that as much of this water as possible shall be used over and over again, thereby eliminating the unnecessary expenditure of thousands of dollars in wells and other equipment. Also that particular attention shall be paid to the "White Water" from suction boxes.

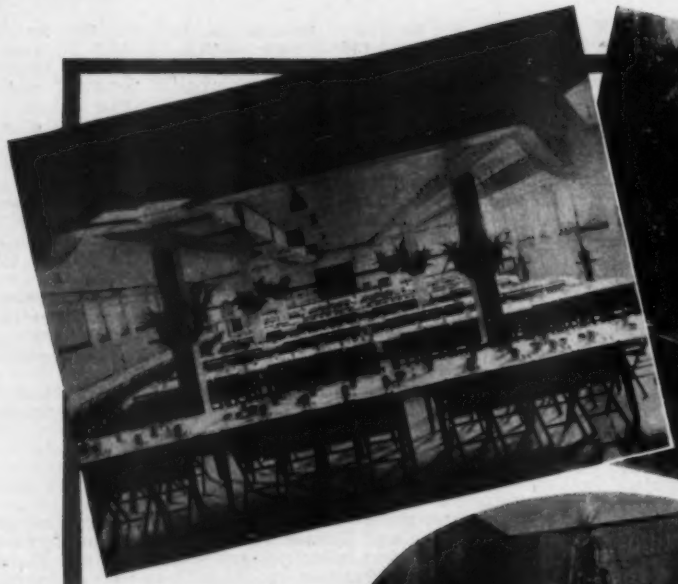
From my own personal experience, I know that any mill using loading material of any kind ought to have some system of settling tanks, to reclaim practically all of the clay and fibres in the "White Water." This can easily be done at a very low cost for reclamation. This clay, etc., can be put right back into the beaters again. Having been screened through the fibre and mesh of the wire on the Fourdrinier, it certainly is of the finest quality, and therefore very desirable to use.

This water is also ideal for use in dropping beaters, as it means the saving of several ounces of color in each beater, as well as a tremendous amount of clay in the course of a year.

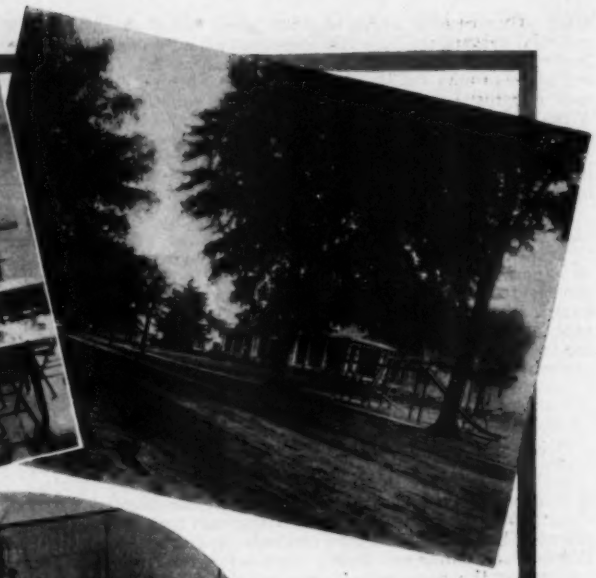
Any mill dumping "White Water" direct to the sewer, is sure losing a lot of good hard cash, and I think few mills today have more of that (cash) than they know what to do with.

All of the water from showers, and also the beaters when thickening stock while furnishing, can be used, especially in any mill washing old paper stock. It is so very easy to overlook a very big waste annually because it looks such a little mite when we see it only for a moment, but as we all know it was "Little drops of water, and little grains of sand, etc."

One good remedy for the prevention of waste I would say, is eternal vigilance on the part of each superintendent about the entire mill.



The cafeteria in the basement of the Community House —a busy place at noon



A glimpse of the Community House showing also a corner of the playground

"'Twas the night before Christmas" —at Parchment

A few of 75 new homes being built at Parchment

A speedy and effective fire protection for K. V. P.

Finding Gold in the Golden Rule

THE high grade of parchment and waxed papers manufactured by the Kalamazoo Vegetable Parchment Company, of Kalamazoo, Mich., has contributed little more to the fame of this company than has the spirit of good fellowship and co-operation with which the entire community of Parchment is imbued. The term "industrial family" applies to Parchment with certain and complete appropriateness.

To express the situation in the words of Jacob Kindleberger, president and general manager of the company: "In our community house garden we grow together, bigger and stronger; that sums up the idea behind our constructive program covering the educational, spiritual, social and physical welfare of Parchment folks."

The development is carried on by an experienced welfare worker who has as his headquarters and "workshop" Parchment's palatial community house. Here it is that the various men's, women's and children's organizations of the community concentrate, the leader of each group acting as a member of the executive committee.

But what seems to us one of the most important of all factors contributing to Parchment's spirit of good fellowship is the consideration shown by the management toward the employees of the company. We do not refer here, only indirectly, to their commendable plan of community welfare work. We refer more directly to the consideration given to the man while he is in his working clothes—between the time when he "punches in and punches out."

In the first place before a worker is hired, Mr. Kindleberger, personally, assures him of the company's willingness to help him make good, and at the same time he is told a little of what will be expected of him as an employee of the Kalamazoo Vegetable Parchment Company. When a worker does not get along as well as it is considered he should, he is given personal attention by the management. "If an employee is disloyal," says Mr. Kindleberger, "if he is shiftless, if he is incompetent, there is a reason. Our theory is to get at the reason. It may be he is a square peg in a round hole, and by shifting that employee oftentimes makes a one hundred per cent man out of a fifty per cent man."

Another means by which this company is increasing the efficiency of their producing organization is by giving the boys of Parchment an opportunity to start young to learn some of the fundamentals of papermaking. This policy not only stimulates interest in the present production of paper but it is a bit of building for the future. Proceeding on this theory, Jacob Kindleberger has made it a point to keep the boys at Parchment busy during their summer vacations.

Of course, due to their ages, which range from 15 to 17, they are not permitted to work on the machines. However, two of these boys during the past summer have mastered, to a surprising degree, the workings of the rag room. It was with a touch of pride that Mr. McClellan, superintendent of the Parchment paper mill division, told us of the progress of these two boys.

Boys Will Be Boys

"After they had been on the job only about two weeks I saw they were getting discouraged; they seemed to feel they had learned all there was to learn about a rag room," went on McClellan, or "Mack," as they all call him—even the youngsters about Parchment. "The novelty had worn off and they were pretty much disgusted with the rag room. So to find out just how much they knew I began to ask them questions. At first I sort of kidded them; asked them the names of the lady sorters, and sure enough, they knew them all—even the first names of many—but when I got down to business and began to ask them about the work done in a rag room and its purpose—they were bright fellows and got my drift right off. They realized that they had scarcely learned anything about the rag room. Well, after that they went back to their jobs and began to learn. The novelty was gone but in its place was a desire for knowledge.

"I took a lot of interest in those young fellows. They were only boys and we didn't work them very hard. During the summer they began to feel that I was just a little better at asking questions than a school teacher."

Here Mack began to search through his desk for something. The meanwhile continuing: "No sir, they weren't stupid boys and after a while they began to ask me questions. The work, however, was different than school. I let them feel that they were holding a place in one of the most vital industries of the nation—and they were. Well, sir, shortly before they had to go back to school I brought them down to my office and had them both write out what they had learned about the work of a rag room."

He had by this time found what he was looking for—the reports which these two fellows had written. These he handed over to us. They were written in a cramped, boyish fashion but withal displayed a concise knowledge of the rag room as will be seen from the following. In order to fully appreciate this bit of "technical" copy" it is well to keep in mind that it was written by a boy at the age when, as a rule, the only knowledge worth while is a knowledge of baseball and fishing.

"Report on Rags"

"The rags are first unbailed then run through the thrasher. This loosens the rags so they can be sorted easier. Next the rags are taken to the screens to be sorted. The buttons are cut off and hard stock thrown out, such as silk, wool, royal purple, turkish red, black and all metals.

"The rags are then sent to the inspecting table where they are inspected. They see that they have no buttons or hard stock in the rags. Then the rags are sent through the cutter which cuts them up, saves time, power and expense. They can make better paper this way. They run on a belt through the duster, then into the rotary room."

"Someday," continued Mack, when we had finished reading the above "report," "us old paper men are going to drop off and it gives a fellow a feeling of satisfaction to know that he has had a hand in training somebody to take his place. Of course you've got to watch them pretty close but we figure it pays to start 'em young."

Aside from the above-mentioned ways wherein the man in working duds receives the helpful consideration of the management, there are numerous other plans. That its help may live in comfortable and congenial homes, there is now under way at Parchment an extensive building program. By means of a carefully developed plan it is possible for any sincere worker to buy a home of his own within but a few steps of his work.

A cafeteria has also been provided for the employees. This is in the large, well ventilated basement of the community house. Here warm meals are served at near cost for those who cannot get home for dinner. In this same basement is the community grocery store.

To illustrate further the extent to which the community plan has been carried out, we show on the opposite page a view of one of Parchment's always spick and span fire trucks, "ready for action."

But when we stop and view this vast program which calls for the expenditure of large sums of money and human energy and is based on none other than the Golden Rule, we constantly find the question creeping up, "Is there, after all, any gold in the Golden Rule?" for you know none of us are in the business just for fun.

In answer to this question we will again quote Mr. Kindleberger. "We treat all employees of our company on the basis of the Golden Rule, because it is the right thing to do. We are firm believers in the Golden Rule. *We have lived long enough on this earth to know that if we do the right thing by our fellowmen, that all other things shall be added unto us, but the motive in the beginning must be right and not mercenary.* To assist an employee with advice or money, if it is domestic affairs that is making him unfit for his work, you are not only helping him, but you are helping yourself. Our opinion is that men think more of being treated as human beings, and some recognition is more desired than silver or gold.

"It is this idea that is back of all of the Parchment ideal, but work of this kind will fail unless your heart and motives are right. To boil this whole system down"—the system that has made Parchment what it is—"to one sentence, it can be summed up in the Golden Rule, 'Whatsoever ye would that men should do to you, do ye even so to them.'"

Catalog on Speed Reduction Drives

The W. A. Jones Foundry & Machine Company, Chicago, has just issued a new and very complete catalog which has been planned with usefulness to superintendents and engineers in mind.

Embodied in this new work will be found technical and practical information, complete descriptive mater and illustrations of typical drives. Dimensions, weights and horse power ratings for complete speed reduction sets are shown.

This catalog is now being circulated upon request.

Michigan Superintendents Meeting

THE Michigan Division of the American Pulp and Paper Mill Superintendents Association held their regular monthly meeting at the Park American Hotel, Kalamazoo, December 21.

If there were any orators in attendance at this meeting they did not make themselves known. It was very obvious that these superintendents were conserving any surplus hot air for their dryers. The evening was spent eating roast duck, asking and answering questions.

And the fact that every question asked was one of vital importance to every progressive paper maker was the fact that made this meeting the success which it most certainly was. It is such meetings as this that makes the much-talked-of progress in the paper industry a reality. Hereon is the germ of industrial progress—a group of men who are at the very source of the industry sitting with their heads together and feeling a sincere fellowship between them.

Mr. Bing, of the Sandusky Foundry & Machine Company, read his paper, "A Successful Suction Roll." This paper was the same as read before the Connecticut Valley superintendents at their meeting held last November in Holyoke, and published in the December issue of The Paper Industry. Following his paper, Mr. Bing was asked many questions regarding the suction roll, all of which he very ably answered.

Pending Questions Answered

Mr. Pountain, Secretary, then read letters answering questions which had been asked at a previous meeting. These letters were from specialists in that particular branch of the industry with which the question was concerned. One of these letters was from The Bagley and Sewall Company and answered a query in regard to the proper pitch for the wire. Extracts from this letter follow: "Under no condition should the wire ever be raised above level at the breast roll. Reason in arranging the depression of the wire at the breast roll must come into play when you are operating upon the free and the slower stocks. The fractions or inches for depressing the breast roll end of the wire in using old paper stock is governed by the character of the stock itself, the amount of water that you use, the length of the wire that you have and the control which you have of the water on the wire. The slower the stock the more depression of the breast roll and the wire.

"A paper maker who thoroughly understands the formation of his sheet can tell whether its formation requires a little more or a little less depression, a little more or a little less water, and careful observation will teach this quickly to the man who wishes to understand. This involves slice adjustment and control, table roll control and suction control. Using the free stock of sulphite and soda, precisely the same thing governs. You have to begin with the water that you are carrying. The slice adjustment, the table rolls that are in contact and the wire, and, as usual, the suction control.

"From the above you will see that we require a large addition of water when running free stock, and in the same manner that we depress the wire on the slow stock to get the water out, we again use the depressed wire to get this additional water out, forming a very much better sheet. If there is any difficulty in carrying sufficient water across the first suction boxes so that the dandy may properly operate, we have a special arrangement on our machines for throwing the required number of table rolls out of contact with the wire."

Silicate of Soda Discussed

The other question discussed at some length was that of using silicate of soda for various kinds of sizing. The Grasselli Chemical Company, in answer to "Is it possible to size paper with silicate of soda, only, using no resin or other size?" state "No, not if you want a water resisting sheet."

The same company was also asked, "Is it possible to size paper for printing purposes with silicate of soda and starch, using no resin size?" Their answer was: "Yes, unless a water resisting sheet is required. Silicate of soda will give a better finish, a snappier sheet and will cure whiskers. Silicate of soda also has a felting action on the fibre, causing the sheet to close up and the back water to clear up. That is, many of the small fibres which naturally go in the back water will be retained in the paper.

Silicate of soda is entirely mineral and when used in paper, the finish put on will remain; therefore the sheet is thinner to weight. Silicate of soda is especially good in print paper when balsam ground wood is used. Balsam ground wood usually causes the sheet to bulk. Silicate of soda will make it lay down and when running printing paper, unless you desire to make the sheet water resisting, silicate of soda and alum, without the starch, is all the sizing that is necessary, as the paper will take ink and the ink will not run."

Philadelphia Quartz Company Gives Views

This question of sizing with silicate of soda was also discussed by the Philadelphia Quartz Company. "It is possible to size paper hard enough for printing purposes with the use of silicate of soda and alum and without any rosin size. Such a paper will, of course, be easily penetrated by water as rosin size is necessary to produce water resistance under ordinary commercial conditions. Silicate of soda and rosin size can be used in the same paper where water resistance is required but we would emphasize the difference between water resistance and resistance to oily materials such as printing inks.

We have seen offset papers sized with silicate and starch without the use of any rosin size. These papers gave satisfaction and gave the added advantage that they were not discolored on long exposure to light. They worked satisfactorily in the service for which they were intended, although they show very low water resistance when tested with the tongue. We know of some cheaper grades of printing paper in which the rosin has been omitted and substituted with silicate of soda sizing with satisfactory results. For book paper the silicate tends to yield a hard sheet, sometimes harder than is desirable although this can be corrected to some extent by the use of a larger percentage of clay."

Mr. Best of the Western Paper Makers' Chemical Company discussed a question regarding High Free Rosin Versus Neutral Rosin Size. Following is his discussion:

Conditions Vary Results

"In some mills the high free rosin seems to work out better than low free or neutral size, and in the same districts you will find other mills with results that show neutral size is what should be used. So it seems to come down to an inquiry as to what conditions we know of that affect one or the other kind of size, since to attempt to show a paper made in one mill against the same sheet made in another mill always brings up the question of what sulphite was used, length of beating, water from what location, etc. It is usually the case now that the beater capacity, for instance of a mill far exceeds the original plans, and the beaters are furnished and dumped with the idea of keeping stock ahead of the chests rather than to follow the old adage of 'making the paper in the beater room.' In a like way the sulphite used may come by a different method of cooking, and all these items come in to vary the conditions which affect rosin sizing sometimes profoundly.

Avoiding Rosin Spots in Paper

"With a high free rosin size we must be sure of obtaining a good solution of emulsion of the size paste; because size improperly dissolved will have sediment consisting of rosin that will never get distributed amongst the fibres, and rosin spots in paper are unpopular to say the least. Then, if the water furnished to the size plant, or to the beaters is such as will bring down the solubility of the size milk, then we must cast about to prevent that condition. With high free rosin milks the retention in milk form is more easily affected than with neutral size. Under certain conditions it has been found advisable to follow the practice of adding the size paste direct to the beater, which means neutral or low free rosin size, to dissolve easily in the stock. Material introduced in the furnish to the beaters may cause improper precipitation, and this all means a size that will not easily be broken down before the ideal precipitation medium is used, that is, alum.

"There has been unlimited discussion as to whether high free rosin, low free rosin, or neutral rosin size works most efficiently, but actual use in the mills has shown that all three kinds of sizes have given results equally satisfactory, and their use is entirely regulated by local and mill conditions. If free rosin is the real sizing medium, why stop at any definite limit? There is nobody advocating going above free rosin in excess of 50% of the total rosin.

"Any saving in alum that can be obtained from the difference in amount of alkali to be introduced in a neutral size over the high free rosin size is negligible, as the difference

will amount to 7% soda ash on the weight of the rosin or per 25 lbs. of size paste. This is approximately one pound of alum, an amount too small to figure in on a practical mill operation.

"And while we are talking about alum, it should be well to consider the so-called ratio of alum to rosin size. It is well known that the chemical reaction of rosin size and alum requires approximately one-third the weight of alum to the rosin used; also that the water used in the total manufacture requires a definite amount, varying in the different mills according to its source. Color will require a certain amount of alum or mordant. In other words, the rosin size is just one of the items that we introduce in the furnish, so why try to blame it for the whole consumption, by using a ratio?

"In a certain mill, the following were the figures showing material used in a furnish that required alum to the amount of 40 lbs. per

	1000 lbs. stock
Total water	9 lbs.
Size (1½% rosin)	5 lbs.
Filler (agalite)	5 lbs.
Old papers	23 lbs.
Color	..
	42 lbs.

This leaves nothing for the color, yet the color, Canary Paste and Orange Y, was set all right and we still had an acid reaction in the head box, which means some one of the parts was slow in taking their share of the alum.

Mixing Alum and Rosin Size

"It does not matter, usually, the order of adding the alum and rosin size. Either alum or the size should be added first, but it is not good to mix them before one or the other is distributed through the stock. If stock is hot, cool it down by dumping part of the beater, then add cold water, then add the size, the alum having gone in some time before dumping.

"The retention of rosin is 100%, when the alum is added in excess. The use of white water back again from the beaters will give good sizing at the start of the run, tapering off to poorer sizing as the run goes on, due to the alum breaking down and giving free acid back in the white water.

Silicate of Soda

"Many experiments have been conducted over a number of years towards sizing paper with silicate of soda, but I have never seen or heard of a sheet of paper that has been properly sized with this material and from the very nature of the product I am unable to appreciate how it can ever replace rosin in this capacity.

"Silicate will give a good rattle and feeling of firmness to the paper, and will tend to keep down fuzz, as it makes the stock handle slow, and will help make the fibres lay out flat instead of sticking out of the surface as in free stock.

"The silicate used should be as neutral as possible to keep down consumption of alum. The alum required for a good neutral silicate will be approximately 2 lbs. alum per gallon of silicate. Some silicates you can buy will consume quite a bit more than this figure.

"The amount of silicate advisable is three gallons per 1000 lbs. stock, which will make approximately 35 lbs. silicate,—it runs about 11½ lbs. per gallon.

"It should be of good color to retain the brightness of the stock.

Starch

"Starch is good for test, rattle and firmness of sheet. Also good to reduce fuzz as in above note for silicate of soda. The starch should be boiled before adding to the beater, as it is only of value when the granules are broken to liberate its slime qualities, and the loss would be very large adding it dry. It is harmful in that it causes slime in the piping, etc.

"The maximum amount used will not run over 50 lbs. per 1000 lbs. stock."

Discussions of Help to All

As indication of the earnestness manifested in the discussions of this meeting let us mention that they extended for hours after a jazz band in the adjoining room had animated a few score of pretty evening gowns and prettier women. The only interest taken in the adjoining gaiety was an effort to shut out "the annoying music."

Those attending the meeting were: Bernard Benson, Williams Gray Co.; Otto Fisher, Bryant Paper Co.; E. H. Gilman, Bryant Paper Co.; Clarence Thorne, Watervliet Paper Co.; Mr. Best, Western Paper Makers' Chemical Co.; Geo. Pountain, Allied Paper Mills; Frank Johnson, Allied Paper Mills; Fred Southerland, Southerland Paper Co.; Frank Eilers, Eilers Mill Supply; N. M. Brisbois, Southerland Paper Co.; H. O. Bing, Sandusky Foundry & Machine Co., Sandusky, O.; E. T. Coughlin, Allied Paper Mills; Clarence Harter, Rex Paper Co.; Wm. Lawrence, Western Paper Makers Chemical Co.; Mike Redmond, Kalamazoo Paper Co.; Jake Kuss, Allied Paper Mills; Albert Linters, Allied Paper Mills; Alfred Bryant, Bryant Paper Co.; Oliver Buswell, The Paper Industry, Chicago.

New England Forestry Conference Held

Mr. Forest H. Colby, Chief Forester of the S. D. Warren Co., of Cumberland Mills, Me., and Boston, and a former Forest Commissioner of the State of Maine, spoke before the New England Forestry Conference on December 27 on the "Forest Needs of the Pulp Industry." The Forestry Conference was a three day meeting of the most eminent authorities not only in New England but from the entire country. The professors of New England college forestry departments, foresters from the Federal Department at Washington including the Chief Forester were among the notables at the conference which met at the State House, Boston. A representative of the Laurentide Paper Company of Canada gave an illustrated talk Wednesday evening, December 27, on the methods used by his company to detect fires on their pulpwood preserves through the use of airplanes.

In speaking on the forest needs of the paper and pulp industry Mr. Colby said in part: "I have been assigned one of the most important topics of your conference, but notwithstanding its great importance I believe if I said just three words and sat down I would have said at least 75 per cent of what there is to say on this subject. Those three words are—Prevent Forest Fires. the pulp and paper business of the United States requires between six and seven million cords of pulpwood annually. This wood is converted into something over seven million tons of paper. Eight percent or a little over of the annual cut of timber in the United States goes into the manufacture of paper each year. Over two and one quarter million cords of this pulpwood is used in the pulp and paper industry in the New England states. About two million cords of coniferous growths and about one quarter million cords of hardwood including poplar make up New England's share of the pulpwood toll.

"Something like one and one half million cords of this two and one quarter million cords is used in Maine. No one has to be well versed in pulpwood or lumber business to see that the cutting of this wood each year is making inroads into our forests. Some tell us that New England need not worry about the pulp supply for the reason that we are so close to Canada. At present about 30 percent of the pulpwood used in New England comes from Canada.

New York state is the largest pulpwood user of any of the states. Is is fair to assume that New York and the middle west are in much the same condition as regards timber supply as New England. Being more familiar with the situation in New England I shall treat my subject largely from the New England standpoint.

New England Forests Ravaged by Bud-Worm

"Maine and eastern Canada are perhaps more unfortunate than any other part of the western hemisphere on account of the ravages of the bud-worm. Unless a person travels the woods roads continuously he cannot realize the damage done by this insect. Conservative estimates from reliable sources state that about 70 percent of fir and at last 30 percent of spruce were killed by the budworm. We know that New Brunswick and Nova Scotia suffered almost as severely as Maine.

"All the large owners of timberland whether pulp makers, paper manufacturers or lumber operators are doing everything they can to salvage this damaged timber. After another season or two most of this budworm killed spruce and fir will be next to worthless. This harks back to my three words, 'Prevent Forest Fires.' It needs no argument to make plain that on account of this killed and dying timber, the fire hazard has been greatly increased and will continue to increase for several years to come.

Urges Paper Mills to Protect Timber from Fire

"I believe all timberland owners especially the large pulp and paper companies should maintain some sort of fire protective system. True the Federal and State Governments are assisting in many ways in this work, but I thoroughly believe there is a limit to Federal and State aid. I believe it is right for timberland owners to co-operate with the governmental agencies. I am not a believer in Federal and State ownership or control of timberlands. I do believe that protection of the forests from fire should be worked out on the co-operative plan. Best results of all can be obtained by timberland owners themselves through protective societies.

This is especially true of the larger paper and pulp mills who own large acreages of timberland. The land owners should carry on educational campaigns through these protective societies, by sending out literature on fire prevention and fire fighting to rural settlements about the timberlands. A few men well trained should be employed by these protective societies to travel through the timberlands constantly.

"A large mapority of people are careful when traveling through the woods, and take pains to avoid doing things that would start fires. The problem is to teach the small percentage of ignorant and careless people the awful havoc of forest fires, the irreparable loss to the timberland owners, to the community and to future generations.

"It takes a long time to grow trees even to a size suitable for pulpwood, so I believe our chief problem should lie in guarding from fire and insect what timber we have left.

Recommends Better Accommodations for Woods Help

"If possible all paper mills should own timberland, and conservatively cut the wood. The old time woodsman is fast disappering and though we need even more intelligent help than in the old days because of modern logging methods yet we are getting a more inferior class of help all the time. I believe much could be saved by the hiring of more intelligent and generally efficient men for the woods. I strongly recommend the building and maintaining of better quarters for the woodsmen, improve camps, clean, modern beds, and in addition a general program of social work such as certain Maine paper mills are now following. At a headquarters camp it is well to maintain a doctor and nurse to attend the men in case of accident or epidemic. The cost of these reforms are small while from my own personal experience I know that great goods results. In some cases I recommend that schools be held at the proper season of the year.

Timberland Taxing a Problem

"The assessing of excess taxes on lands on which timber is maturing should stop. The timberlands should not be taxed in the same proportion as the realty of the company and the latter could well afford to stand a greater share of the taxes which could then be lifted from the timberland.

"This is especially true where paper companies undertake to plant young trees. No other growing crop is taxed until harvested. Yes, the question of timberland taxation is a delicate and difficult one to work out but I believe it is one of the most serious problems of the paper industry. A change in the laws on this subject would stop much needless cutting of young growth for many farmers owning small but potentially valuable pulp lands cut them at an early age to escape taxes."

New England

Boston, January 1.

From the manufacturer's standpoint the new year opens auspiciously in New England. Paper prices are on the upward trend and though raw materials are also strengthening in price the heavy demand for all grades of paper (except board) more than offsets this other condition.

It is also encouraging to hear as the old year passes out that the spruce bud-worm which has ravaged the once incomparable spruce and fir timberlands of northern New England, is decreasing noticeably, and the Kennebec River drainage in Maine is reported to be well cleared of the pest.

The New England aspect of the raw material situation can be briefly summarized as follows: Casein, that all important ingredient used by the coated paper manufacturer, is exceedingly scarce. Shipments from Buenos Aires direct to Boston as a small part of general cargoes made up largely of wool and hides, have enabled New England paper mills in the past to receive reasonably prompt deliveries, but the market of late has become seriously bare of spot or future offerings and the material has advanced to a new season's high of 27c to 29c per pound on recent sales. Coal is showing marked advances. Since December 1st the price has gone to $10.50 and over on cars at Boston for New River and Pocahontas. Several of the larger paper mills bought English coal this fall and though some report satisfactory results the majority declare the quality decidedly inferior to the run of mine domestic coals, either Pennsylvania or West Virginia. Waste paper is the other commodity which has effected radical increases in price recently. Although the board mills are least active of all branches of paper making yet mixed papers and folded news have advanced from $4 to $6 per ton during December, and are quoted at $20 and $26 per ton f. o. b. Boston respectively.

Early in January the New England Paper Manufacturers Rate Committee of which Charles L. Whittemore is chairman, will present their side of the New England paper rate adjustment case to the New England Freight Association at the latter's rooms in the South Station, Boston. The New England railroads exclusive of the New York, New Haven & Hartford, are attempting to abolish the less carload commodity tariffs within New England and establish third class ratings for this sort of paper traffic. On carload lots they wish to establish a straight sixth class rating compared to present rates which vary from 75 per cent of sixth to fifth class. The paper men concede that unreasonably low rates are in existence but counter this by pointing out the unfairly high rates to such trunk line cities as New York, Philadelphia, Baltimore and Washington. They will demand joint action of the New England and trunk line roads to lower these rates before they will concede the lower New England rates. If the New England roads are not ready to grant this request the case will be taken to the Interstate Commerce Commission. Practically every paper mill in New England is interested except the comparatively few on the New Haven railroad.

Changes in Traffic Association

Mr. C. H. Tiffany who has been traffic manager of the New England Paper and Pulp Traffic Association since that organization's formation in 1912, has been retired on pension. Mr. Tiffany, before his affiliation with this organization, was traffic manager of the West Virginia Pulp and Paper Co., and is conceded by every railroad man and traffic specialist to be one of the leading authorities on railroad matters in New England. He has made an enviable record with the Association, which through his guidance has fought for and obtained many needed rate reforms and secured abatement of unfair railroad rules and practices.

In his place the Association has appointed Mr. Charles L. Whittemore who has long been secretary of the same organization as well as chief of the Traffic Department of the S. D. Warren Co. Mr. Whittemore is an energetic, capable and widely known traffic specialist and the Association's work will be continued in thoroughly reliable hands.

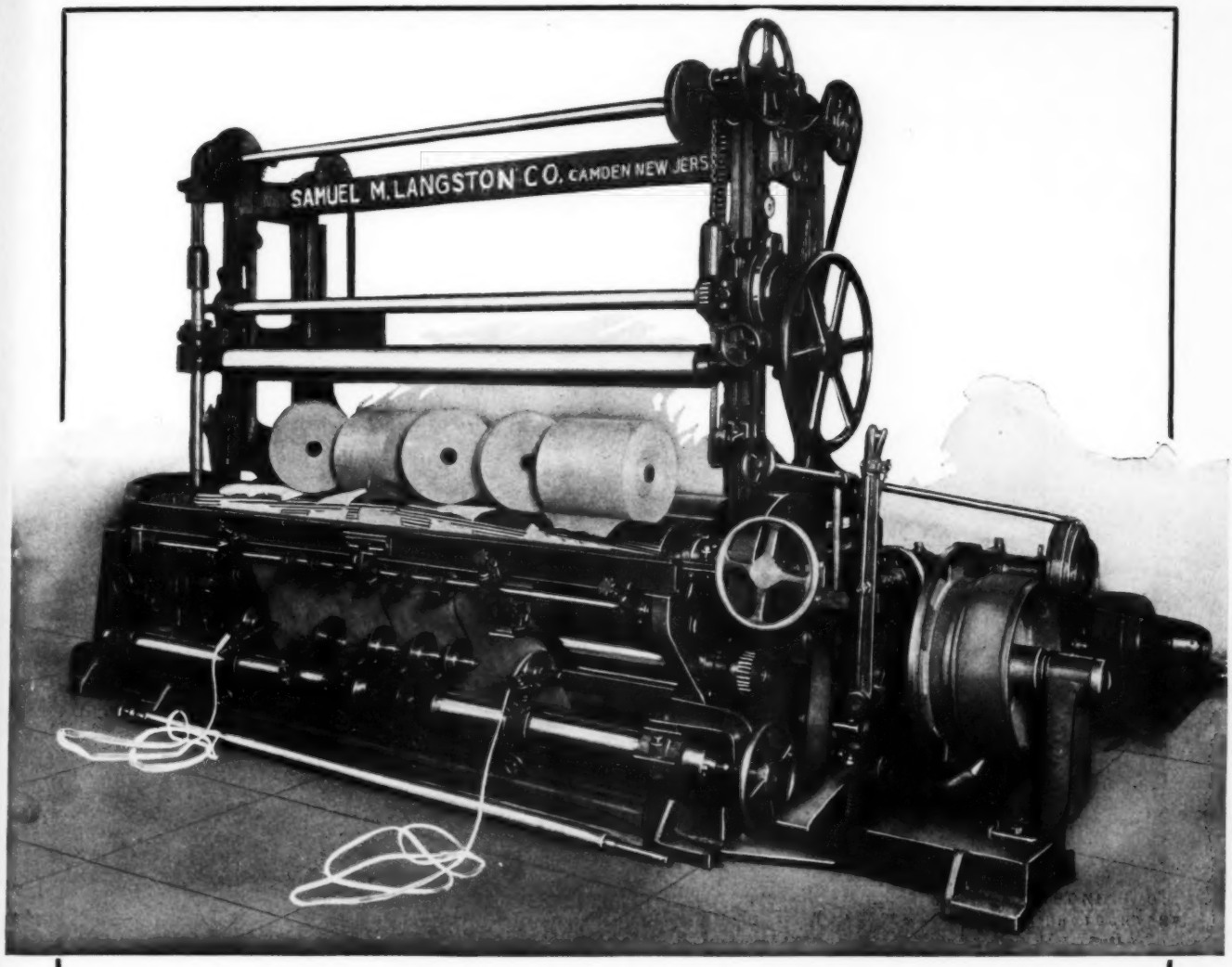
Assisting Mr. Whittemore will be Mr. A. A. Raphael. The Association which includes some 28 of the largest and most powerful paper mills of New England, has offices at 88 Broad Street, Boston.

Crane & Co., famous the world over as makers of bank note and bond papers, and who have operated business since 1801 as a partnership, formerly incorporated their business the week preceding Christmas. The name is practically unchanged, Crane & Co., Inc. The capitalization was $3,000,000 consisting of 30,000 shares of common stock par value $100. The temporary incorporators are Reuben C. Pierce, president, Payson E. Little, treasurer, and Frederick G. Crane Jr., and Attorney James F. Bacon. Permanent officers will be elected January 2. The new company will operate all the Crane interests including the mill at Westfield, Mass., and the Pioneer and Government mills at Dalton, Mass. Mr. F. G. Crane, now head of the Crane family, stated that the complicated situation arising on death of a partner made the incorporation desirable.

The Ironsides Board Corporation mill at Norwich, Conn., was sold at public auction this past month to J. E. Smith of Baltimore, Md., proprietor of the Chesapeake Paperboard Corp. It is understood that the price was about $200,000, unpaid taxes of about $12,000 being paid by the purchaser. The company has been in financial hot water for several years. It is the conservative estimate of Bostonians with a knowledge of the property that a large sum must be spent in putting the mill in proper running order. It was a three machine mill, but there is a report to the effect that but two of the Fourdriniers were included in the sale.

The new owners of the Ironsides Board Corporation of Norwich, Conn., have displayed commendable foresight in securing as superintendent, J. H. Eilers, who has been mill manager of the New Haven Pulp and Board Co. Mr. Eilers is looked up to as an unusually capable executive and just the man for this position. He has had service with the American Writing Paper Co. and the United Paper Board Co. in years past and can handle a mill such as the Ironsides in a manner to get the most out of it. A tribute to his ability is the belief that though the mill has previously been a failure it will probably now succeed under his managership, a belief generally held in New England.

Improvements at the plant of the Windsor Locks Paper Co., at Windsor Locks, Conn., are about completed. Merely by overhauling the machinery, and installing a few labor saving devices not the least of which were concrete floors, smoother



The Langston "BA" Winder or Rewinder

is built 62 inches to 92 inches wide. It is fitted with Koegel Cutters (ball bearing) for general work or with Langston type of driven cutters for narrow roll work. Both types are Shear Cut which means "Clean Cut"

Samuel M. Langston Company

CLEAN SHEAR CUT CUT

Camden, New Jersey U. S. A.

WASTE

Waste might be well defined as the difference between profit and loss.

Waste in a board mill results from using mixed papers in the old way, which wastes labor, power and the finished product.

Waste is overcome in these particulars by using the **Shartle Breaker System.**

"The proof of the pudding is in the eating thereof."

Ask the mills using **Shartle Breaker Systems.**

The SHARTLE BROTHERS MACHINE CO.

Middletown, Ohio

operations and a larger volume of paper output is reported. The other paper mills of Windsor Locks, that of C. H. Dexter & Sons and the Windsor mill of the American Writing Paper Co., are operating at 100 per cent of capacity, business conditions being reported better than for two years.

Speaking at the Forestry Conference at Boston, R. C. Bryant, professor at Yale School of Forestry, declared that in 32 years all New England's merchantable and pulpwood timber will be gone, and more than half of the paper and lumber industries now located here frozen out if the present rate of consumption of the existing timber continues. He sounded a note of warning to the paper and lumber industries of New England declaring that unless they reforest they cannot hope to survive Canadian and far western competition.

It is reported in Boston by lumber operators interested in Newfoundland timberlands, that a huge newsprint mill with a capacity of 400 tons of paper daily and to cost $18,000,000, is to be built in the island province. Half of the capital necessary would be raised by the British government according to the reported plan, the other half by an issue of 25 year bonds. Sir Richard Squires, prime minister of Newfoundland, negotiated arrangements with the government at London, according to our informant.

The New England Industrial Corporation was formed at Bangor, Me., during December, and incorporated with $500,000 capital stock. The concern purposes to deal in and handle timberlands, stumpage rights including pulpwood lands. The incorporators are Millard C. Schoppe, president; Archer M. Robbins, treasurer; Ralph F. Colburn, Norman E. Whitney, Bangor and Harry Wessendorff, Auburn.

Construction is well under way on a storage building at the mill of Bird & Son at East Walpole, Mass. The architects are Monks & Johnson, Chauncy Street, Boston, contractor, M. W. Allen Construction Co., Walpole. It will be of wood, one story in height, 98 by 224.

Work has been started at South Hadley Falls, Mass. on a factory for the Nashua Gummed products Co. The factory will be 140 by 147 feet of brick, one story high and will cost $40,000. The Austin Co., of 217 Broadway, N. Y., are the contractors.

The Paper Products Co., which will make various materials out of paper including paper bags, etc., has located at Mechanics Falls, Me., removing from Bethel, Me. They will manufacture their own pulp and paper it is understood.

Lower water than during the 1921 drought is being experienced by paper mills along important Maine rivers. Along the Kennebec river the lack of water has caused a shortage of power and of water for use in the paper mills.

Canada

Montreal, Quebec, January 1, 1923.

Canadian trade at the close of the year is in a very satisfactory condition and much better than could have been confidently expected twelve months ago. Money is fairly plentiful due to huge crops, and paper industry prosperity.

The total value of exports in pulp and paper for November were $12,076,000, or approximately $2,000,000 more than that for the corresponding month of 1921. Of this the United States took $10,362,000 which shows the growing importance of this trade.

The increase in the demand for news print shows that the exports for November were 1,890,000 hundredweights or 550,000 more than those for November 1920.

The exports of wood pulp were also greater, having been 1,731,801 hundredweights as compared with 1,557,136.

Spanish River Company Complete Electric Generating Plant

The Spanish River Co., have completed their electric generating plant at Sturgeon Falls, and all the mills are busy. The company operates 14 newsprint machines and is the world's second largest producer of print papers. There are three machines at Sturgeon Falls, six at Espanola and five at Sault Ste. Marie, all running to capacity. The daily output is about 670 tons of news, 610 tons of groundwood, 240 tons of sulphite pulp and 35 tons of wood board pulp.

The company now plans to use water transportation more extensively as far as shipments are concerned to the United

HAMILTON ENGINES

A Tiny View of the Immense Shops, Showing Some of the Large Tools

Come and Look for Yourself!

THE most convincing arguments about Hamilton manufacturing facilities are Hamilton tools and workmen. That is why we would like to have the chance of taking you through our plant. We know you would enjoy it, as have the many engineers who have visited us.

Hamilton mechanical equipment is unique. In this plant you will find no old or obsolete tools. The big planers with capacity of 13 feet between housings, radial drills, lathes, and boring mills with capacity of 20 to 24 feet diameter, are remarkable for their size, completeness and arrangement in the immense machine shops, so that work can be properly routed. Moreover, they are equipped with every mechanical device for increasing quality production not only for the larger units, but for the smaller sized engines as well.

When you visit our plant, you will meet not only some of the engineers and executives, but also the skilled workmen, most of whom have been with the Company for many years. In fact, forty-six have been in its employ for over twenty years.

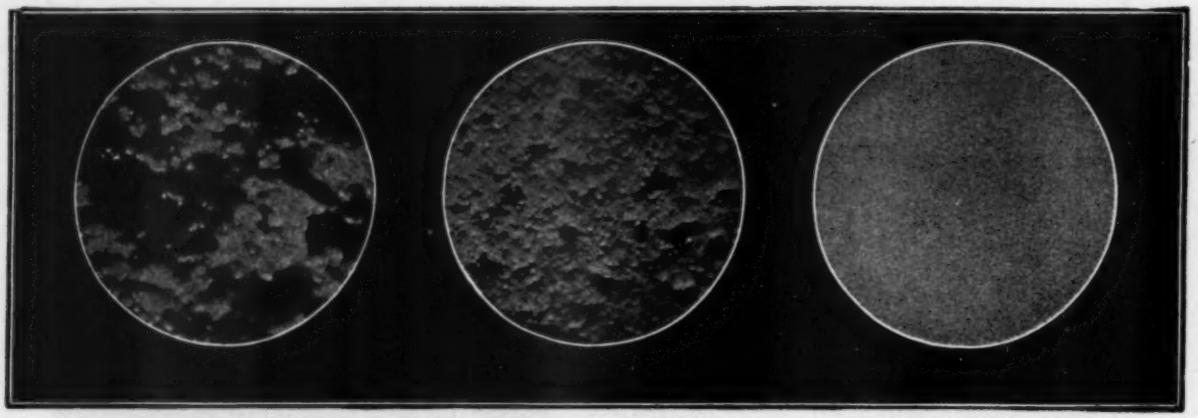
Hamilton engines and machinery are made of honest materials, correctly designed, built by skilled workmen on the best tools obtainable. That is why the name HAMILTON stands out to attest the victory of quality.

If you cannot visit our plant, tell us of your power problems. Our engineers will serve you gladly—and freely.

The Hooven, Owens, Rentschler Co.

Hamilton Engines and Machinery

HAMILTON, OHIO



FLAT-FINISH PAINT EGG-SHELL FINISH BARRELED SUNLIGHT

Paint surfaces photographed under powerful microscope—each magnified to same degree

The microscope shows why dull finish paint collects dirt

Three photographs of interest to every factory owner, manager and purchasing agent

THE above illustration shows clearly why Barreled Sunlight is being used today in thousands of the best equipped industrial plants throughout the country.

The first circle shows what flat-finish paint looks like when seen under the microscope. The second shows a high-grade "egg-shell finish" paint.

These paints—smooth enough in appearance—are actually rough and porous to an astonishing degree.

This makes it easy to understand why they collect dirt so readily—and why factory interiors coated with them require frequent repainting.

The third circle shows Barreled Sunlight—the Rice Process White—magnified to the same degree. Yet even under the powerful microscope its surface is smooth and unbroken.

This lustrous, even surface of Barreled Sunlight is highly resistant to all forms of dust and dirt. That is why Barreled Sunlight is a "long-service" paint. It retains its light reflecting whiteness. Even if soiled in the course of time it can be washed clean like white tile.

Barreled Sunlight is actually guaranteed to remain white longer than any gloss paint or enamel, domestic or foreign, applied under the same conditions. Flows freely from the brush. May be applied by spray method also as it contains no varnish. Sold in barrels and in cans.

Where more than one coat is required use Barreled Sunlight Undercoat. Send for our booklet, "More Light."

U. S. GUTTA PERCHA PAINT CO.
Factory and Main Offices
31 DUDLEY ST. PROVIDENCE, R. I.
New York—350 Madison Ave.
Chicago—659 Washington Blvd.
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And 50 other distributing centers in U. S. A.

Save the surface and you save all

Barreled Sunlight

THE RICE PROCESS WHITE

States since the costs of shipping are lower and there is less danger of accidents. By this means paper can be laid down in Chicago, Milwaukee, Detroit, Cleveland or Toledo within seven days after the commencement of loading at any of the three units of the company, located at Sault Ste. Marie, Sturgeon Falls and Espanola.

Canadian Soapstone

The Department of Commerce has recently been advised by Consul Dudley C. Dyer, at Fort Williams, Ontario, of the formation of a concern which will mine soapstone in the Wabigoon district, about 200 miles northwest of Fort Williams. The company is said to own one of the largest soapstone deposits known, and it is claimed to be the only deposit in Canada that can be worked commercially. Samples of the stone are reported to be of a greenish color, easily worked and of excellent quality.

The development of the industry will be watched with interest by the pulp and paper trade who use this stone for lining kraft mill furnaces and pulp digesters. It is also used extensively in the electrical, rubber goods and other industries.

Annual Meeting of Canadian Pulp and Paper Association

The annual meeting of the Canadian Pulp & Paper Association will be held at the Ritz-Carlton Hotel, Montreal, on Friday, January 26. A business session will be followed by a luncheon and the usual banquet.

The members of the Woodlands section of the Association will meet on the day previous, January 25, one of the principal topics for discussion will be the utilization of dead or dying timber in the making of pulp. Dr. J. L. Bates, formerly superintendent of the Forest Products Laboratories of Canada, will be among the speakers on this subject.

Ellwood Wilson, Chief Forester of the Laurentide Company, Grand Mere, Quebec, will talk on the advancement that has been made in forest research work in Canada and its future.

Canadian Exports

The pulpwood market is hardening. There is more business, and the tendency is toward a better level of prices.

Exports for October were 93,403 cords valued at $992,934, compared with 94,351 cords valued at $974,560 in September. In October, 1921, the exports were 47,203 cords valued at $587,674. Exports for the seven months period were 599,415 cords valued at $6,222,835, compared with 468,591 cords valued at $6,134,459 for the corresponding seven months of 1921.

Montreal Light, Heat & Power Company, has placed an order with the General Electric Company for four 10,000 K. V. A. 136-pole water-wheel driven generators, which will be duplicates of the 14 generators already installed at the Cedar Rapids plant, Quebec. The contract value of the generators is about $600,000, and together with the contract for auxiliary generators and switchboards allotted to the Canadian General Electric additional units will cost about $1,100,000.

The Strathcona Paper Co., Limited, which has been running for a number of years at Strathcona, Ontario, has been granted a federal charter with a capital stock of $600,000, to manufacture and deal in pulp and paper products of every kind. The company manufactures sheathing paper and board—about 30 tons daily. The head office is in Strathcona in Lenox and Addington. The directors are William James Findlay, G. R. Findlay and Bruce E. Findlay.

The Spruce Falls Co., have their new sulphite plant in operation and power for the time being is generated by steam turbines producing 2,500 h. p. They are also erecting a new dam on the Kapuskasing River which will eventually develop 3,000 h. p. The work of erecting homes in the town of Kapuskasing, northwestern Ontario, has begun and on completion will form a model community in this section.

G. T. Clarkson, of Toronto, has been appointed permanent liquidator of the Nipigon Fibre and Paper Mills of Nipigon, Ontario. The total liabilities are given at $561,467.40, comprising admitted claims, $7,243; unsettled ordinary claims, $313,713; unsettled preferred claims, $2,034; unsettled secured claims, $100,687; and possible liabilities on which no claim has been made, $137,000.

Becker & Co., of London, England, who recently issued £300,000, 7% notes at 90, covering the recent transaction with the Laguenay Pulp Company, and other Quebec concerns,

GET BETTER RESULTS WITH CLEAN, UNIFORM ROSIN

Many paper manufacturers, who are using Hercules Wood Rosin, have found that it improves their products and reduces their costs by eliminating changes in processes and formulas to suit variations between different lots of rosin. The reason is that Hercules Wood Rosin is free from impurities and is uniform in quality.

The large capacity of our three modern plants and the fact that production is, at all stages, under careful technical supervision and chemical control assure you of a dependable supply of Hercules Wood Rosin with the qualities you need for efficient work. Except for the whitest papers, it gives results equal to or better than gum rosin.

Our technical service men will gladly co-operate with you in adapting our rosin to any special requirements you may have.

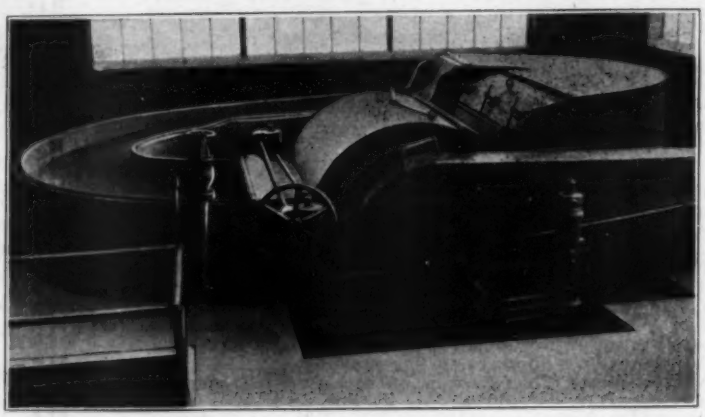
HERCULES POWDER CO.

WILMINGTON DELAWARE

Sales Offices:

New York, N. Y.
Chicago, Ill.
San Francisco, Calif.
Chattanooga, Tenn.
St. Louis, Mo.
Louisville, Ky.
Buffalo, N. Y.
Duluth, Minn.
Birmingham, Ala.

HERCULES
Naval Stores
Produced Under Chemical Control



Five Repeat Orders on NIAGARA Beaters in One Month

You Can Sell Beaters with Advertising But Performance Only Wins Repeat Orders

During the past month five orders for Niagara Beaters (varying in number from 1 to 4) have been received from old users of this exceptional engine. No better proof of its excellence could be given than this.

These orders come as a result of Niagara performance.

Niagara Beaters

1. Save power.
2. Save space.
3. Save time and labor.
4. Save on initial cost and installation cost.
5. Make better paper.

We have ready for you proof of the above statements. If you are interested in more efficient beater performance let us give you full particulars about the famous Niagara.

VALLEY IRON WORKS COMPANY

Plant: APPLETON, WIS.

New York Office: 350 Madison Ave.

For You

We have ready to send attractive folders and pamphlets containing information valuable to anyone using beaters. A letter will bring them to you.

had no difficulty in disposing of the flotation. The issue was over-subscribed. Sir Frederick Becker, head of the company, is well known in Canada, where offices of the firm are maintained.

The Whalen Pulp & Paper Co., have resumed work at their big plant at Swanson Bay, B. C., where about 300 men are employed. The mill will turn out about 50 tons a day of sulphite pulp. When the three plants at Port Alice, Swanson Bay, and Wood Fibre are in operation, the company will be able to produce about 250 tons of pulp daily.

The Taragne Lumber Co., Limited, has been granted a charter, capital stock $49,000. Head offices at St. Moise in the district of Matane, the company is empowered to sell logs and pulpwood as well as pulp. The incorporators are Joseph Dufour, of St. Moise, G. Arthur Dufour and others.

The Fort Williams Paper Company, Fort Williams, will soon be in operation. The equipment is now installed and the first shipment of a thousand tons of sulphite pulp was recently made by boat from the sulphite plant of the Spanish River Pulp & Paper Mill at Sault Ste. Marie, Ont.

The Provincial Government of Quebec have offered to raise a large dam on Lake Kenogami for the Chicontimi mills, which with a constant and regular supply of water throughout the year, will enable them to increase their production by 30,000 tons of wood pulp per annum.

We understand that L. A. Alstead, who is the head of the Great Lakes Pulp & Paper Co., is satisfied with the progress that has been made preparatory to the erection of a $3,000,000 plant at Port Arthur. Electric energy will be secured from the Provincial Hydro Commission.

The Forest Products Laboratories of Canada have recently issued a bulletin emphasizing the fact that the maintenance of the supply of jack pine is of national importance, not only for use as railway ties in Eastern Canada, but also on account of its increasing value as pulp.

McDougal & McNeil, contractors for the construction of the Wigwam Pulp & Paper Co., have received word that the contracting outfit has been shipped from Vancouver to the scene of operations, McNab, B. C.

During the fourth week in January, the annual meeting of the Newsprint Service Bureau, New York, will be held in Montreal, and it is expected that this important gathering will attract a large number of American visitors.

Acme Trading Co., Bank of Montreal building, Three Rivers, Quebec, are contemplating the erection of a pulp mill. R. Ryan, Municipal building, Three Rivers, we are informed, is one of the interested parties.

There is likely to be greater activity in the pulpwood line along the river Magagnadavic. It is reported that the erection of a large paper mill at St. Stephens is likely to be accomplished during the year.

Ed. Silver has been appointed superintendent of the Abitibi Power & Paper Co. plant, at Iroquois Falls, Ontario. Mr. Silver started his career in Augusta, Me., some sixteen years ago.

Donnacona Paper Co., Ltd., on the Jacques Cartier River at Donnacona, Quebec, have stopped work on the storage dam in course of construction until the spring, when it will be finished.

F. W. Braun, recently of the Fraser Companies, Ltd., Edmundson, N. B., has been appointed plant manager of the Nashwaak Pulp & Paper Co., St. John, and has started his new duties.

It is reported that the McIlroy Belting & Hose Co., of Hammond, Indiana, are contemplating the erection of a $20,000 factory at Brampton, Ontario.

The Lawrence Pulp & Paper Co., Three Rivers, Quebec, are putting in the foundations for a two story office building.

The Conewago Felt & Paper Co., are putting up a new mill at York Haven, Pa. Mr. O. R. Emigh is the general manager and Mr. E. E. Brunner heads the company.

TYLER FOURDRINIER WIRES

What causes wire marks

PAPER mill superintendents who specify Tyler Fourdrinier Wires have a minimum of difficulty with wire marks appearing in their finished paper.

The causes of paper marks—irregular meshes, wrinkles, and poor seams—are guarded against when Tyler Fourdrinier Wires are being manufactured.

The firm weaving of the wires, the uniform accuracy of the mesh, the careful workmanship when making the seam, are all gauged to the problem of reducing the possibility of wire marks to a minimum.

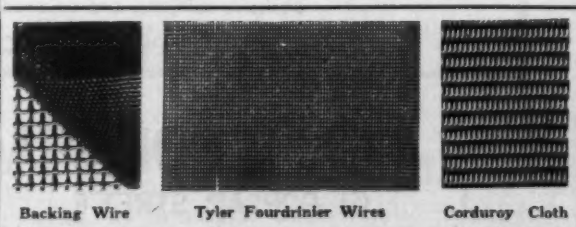
Paper made with Tyler Wires has increased value because of the greater freedom from wire marks.

Let us send you a sample for inspection.

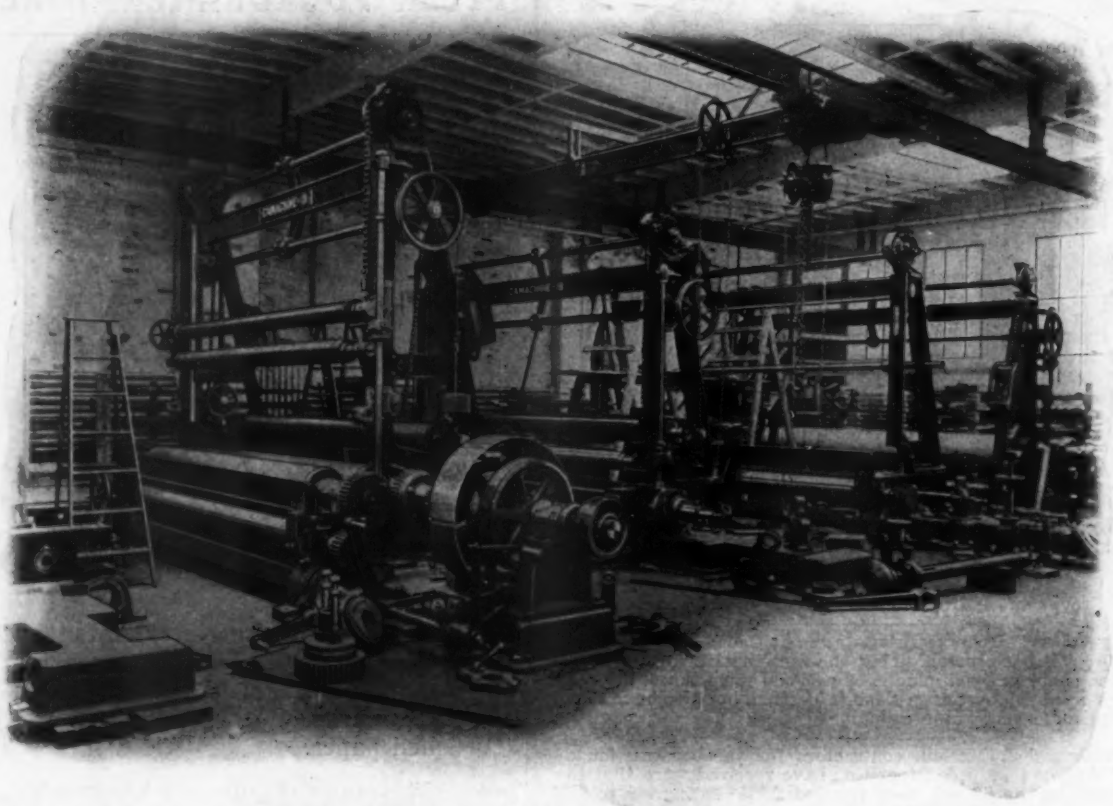
THE W. S. TYLER CO.

Cleveland, Ohio

Manufacturers of Fourdrinier Wires, Cylinder Faces, Backing Wires and Corduroy Cloth



Backing Wire Tyler Fourdrinier Wires Corduroy Cloth



"CAMACHINE 18" PAPER AND BOARD MILL ROLL-WINDERS IN COURSE OF CONSTRUCTION IN CAMERON SHOP

"Camachine-18" is for service in paper and board mills as winder or rewinder.

Each machine is built, tested and guaranteed with reference to the individual requirements of customer.

The ability to save labor and waste is the one vital point in judging the merits of a machine.

CAMERON MACHINES (CAMACHINES)

are built in a complete line of types and sizes to provide for the whole range of requirements in the processes of slitting and roll-winding

REQUIREMENTS OF PAPER AND PAPER BOARD MILLS, PAPER CONVERTING PLANTS AND PAPER GOODS MANUFACTURERS for rolls of any width, diameter, or weight, are covered by **CAMACHINES**, types 6, 8, 9, 10, 12 or 18.

REQUIREMENTS OF TEXTILE, RUBBER AND MISCELLANEOUS GOODS MANUFACTURERS, for rolls of all sizes made of all kinds of materials such as plain or coated fabrics, felt, tinfoil, asbestos, abrasive cloth, etc., are covered by **CAMACHINES**, types 6, 8, 9, 10, 24, 26, 34, 36, or by

SPECIAL TYPES FOR SPECIAL OR INDIVIDUAL REQUIREMENTS

CAMERON MACHINE COMPANY

61 POPLAR STREET, BROOKLYN, NEW YORK

PATENTEES AND BUILDERS OF CAMERON MACHINES

Fox River Valley

Appleton, Wis., Jan. 1, 1923.

William T. Whiting

William T. Whiting, one of the organizers of the Wisconsin River Paper and Pulp Company and its vice president from the time of its organization, died on New Year's day at Stevens Point, at the age of 84. Death resulted from pneumonia. He was ill only a few days. Mr. and Mrs. Whiting had lived in Oshkosh since 1905 but had established a temporary home at Stevens Point last fall to be with their daughter, Miss Kathryn, who is a teacher in the Stevens Point school. Mr. Whiting was known to paper mill men all over the country.

The decedent was born in New York but came to Wisconsin when he was a boy, settling with his parents at Ripon, where he was living when the War of the Rebellion started. He enlisted immediately and helped organize a company of volunteers. Mr. Whiting served during the war, fighting in several major battles but was not seriously injured. He was discharged with the rank of captain.

Seven or eight years after the war he went to Stevens Point, where he purchased land along the Wisconsin river and then induced capitalists of the Fox river valley to develop it by constructing a dam and building a paper mill. Mr. Whiting was active in the mill until a few years ago. About 20 years ago he was one of the organizers of the Whiting Oil Company, which brought in several oil wells near Bartellsville, Okla. This business later was disposed of.

Funeral services were held Wednesday, January 3, at Stevens Point. The body will be buried in the family lot at Ripon. George A. Whiting of Neenah, president of the Whiting-Plover Paper Company, is a brother of the decedent.

New Mill at Neenah

The new Valley Paper Mills Company of Neenah expects to be ready to begin manufacture of paper early next fall, it was announced from the company's office. The foundation is nearly completed. Laying of brick for the two story factory building will be started in the spring. The plant will be 627 feet long by 175 feet wide, thoroughly modern and fireproof.

Light weight book papers will be made on two machines, it was said. The mill will have a daily capacity of 50 tons. The machines have not been ordered and no information is available concerning their size or type. William C. Nash is general superintendent of the company and designed much of the building and equipment. Mr. Nash was superintendent of the Lakeside mill for a number of years, superintended the Telulah mill of the Fox River Paper Company for a time and was with the Gilbert Paper Company for about 20 years.

The company's original plan was to make grease proof and glassine papers but the withdrawal of Emil Pohl, holder of the processes, from the company, resulted in a change in plans.

The new plant is being erected at Neenah, at Blair Springs, because of the excellent spring water available there.

The Fort Howard Paper Company at Green Bay will soon occupy the addition to its mill which is practically complete, save for a few minor details. The addition will remove the handicap under which the company has been operating.

An automatic sprinkler system is being installed in the two plants of the Peshtigo Paper Company at Peshtigo, Wis. The work will be finished in two or three months.

Kalamazoo Valley

Kalamazoo, Mich., January 1, 1923.

The plant of the E-Z Opener Bag Company at Taylorville. Illinois, has been purchased by the Hopper Paper Company, an Illinois corporation capitalized at $500,000. The organizers of the new corporation are, with practically no exception, Kalamazoo men.

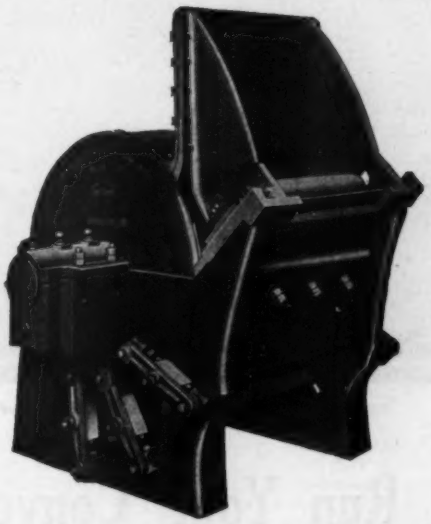
The newly purchased plant includes one 126 inch Black-Clawson Fourdrinier machine, six 1,200 pound beaters and two Jordan engines. An envelope division is now under construction. When all improvements are completed the mill will have a daily capacity of about 20 tons, most of which will be converted into tablets, envelopes and papeteries.

The officers of the new company are: B. Hopper, president; Walter M. Provine, vice president; K. R. Cobine, secretary, treasurer and general manager. The above together with S. J. Monroe and Sam Graff comprise the board of directors.

The Michigan Cartoon Company, Battle Creek, which was originally organized in 1907, will be reorganized and re-capitalized. It is now capitalized at $500,000.

REDUCE YOUR BEATER COSTS

By running your Paper Stock, Magazines, Books, Old Paper and Boxboard, Frozen or Dried Pulp Laps through a



MITTS & MERRILL

GRAVITY FEED

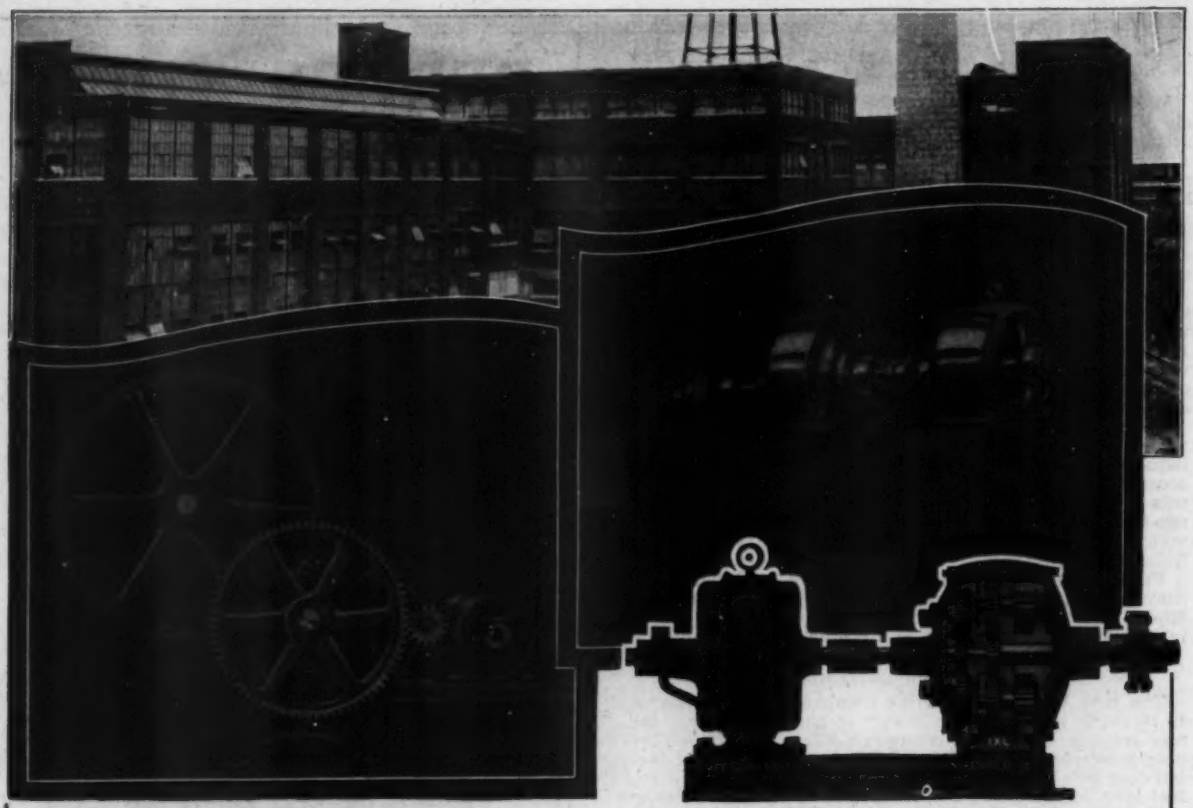
SHREDDER

All kinds of stock can be prepared, which will make the beating job take less power and do the work in less time.

We also build the best "Hog" in the world to reduce pulp mill bark and wood refuse.

MITTS & MERRILL

1013 Tilden St., SAGINAW, MICH.



Speed of motor to operate storage tank agitator reduced by means of four open gears.

Showing how simply speed of motor is reduced by Foote Speed Reducer.

Run Your Conveyors, Shredders, Etc., at Less Cost

When you use **Foote Speed Reducers** for reducing the speed of your motors operating your conveyors, shredders, etc., you greatly reduce maintenance and operating cost.

Foote Speed Reducers are an entirely enclosed means of reducing motor speeds—all gears and bearings run in oil. Unlike open gears, belting and chains, they are protected against the undue wear caused by dust, dirt and grit. **Foote Speed Reducers** give many times the length of service given by open equipment.

Foote Speed Reducers are so scientifically engineered that 86% to 94% of the motor power is delivered to the operated machine.

Foote Speed Reducers are the most economical means of reducing motor speed because they require practically no attention or repairs —last long and give dependable, uninterrupted service.

Foote Engineering Service

Let our Engineers assist you in determining the best method of reducing the speed of your motors. This service is yours without cost or obligation. Write us today. Send for literature.

MEMBER OF AGMA

Foote Bros. Gear and Machine Co.

Manufacturers of Rawhide and Bakelite Pinions and Cut Gears of All Kinds. Send for Catalog. Special Machinery Made to Order. Submit Your Blueprints.

227-237 N. Curtis St. **CHICAGO, ILL.**

J. R. Shaya, Jr., 145 Greenwich St., New York City

King & Knight, Underwood Bldg., San Francisco, Calif.

Interesting Paper On Rubber Latex

FOLLOWING is an abstract of a paper given by Mr. Frederick Kaye read before the Institute of Rubber Industry at the Engineers' Club, Conventry Street, London, England, on September 4. This was a joint meeting of men of the Rubber Industry and Paper Makers.

"Today, by the application of rubber latex to paper-making, we have wedded two of the most important and fertile of industrial materials—what a prodigy should spring from the union—an abounding resilient literature and an adventuring broadcasting of rubber more and more intimately into our homes and daily journeyings. The man in the train softly turning over a newspaper made of rubber latex paper. The girl on the golf links, with graceful ankles clothed in rubbex latex, vegetable leather boots, will not fear the rain or the storm. With our libraries filled with cheaper books, and our homes decorated with new artistic effects on walls and on the floor, we shall feel that the real rubber age has come at last.

"The study of rubber latex and other latices has been a fascinating subject for me for some years. In 1909-1910-1911 I was engaged in British East Africa, Uganda, Mexico, and the sub-tropical regions of South Africa in the investigation of the products from rubber-yielding trees—both indigenous and imported—wild and cultivated in those countries. Since that period I have devoted considerable time to the study of methods of coagulation, etc., of the latices. Early in 1917 I was invited to conduct researches on the problems connected with the manufacture of asbestos paper, millboards and asbestos-cement sheets at work near Manchester, and this gave me considerable insight into the interesting subject of paper-making. At the end of 1918 I joined the Research Department, in connection with the War Office, on airship fabrics at the College of Technology, Manchester. Since that time I have had great opportunities for experiments in practical paper-making, in the paper-making department of the college, with various latices I had brought from abroad some years previously, as well as with new supplies imported for me. So, to plagiarise Herbert Spencer—it was by a fortuitous concourse of circumstances I was led to develop the idea of the value of rubber latex in paper-making.

Application of Rubber Latex to Paper-making

"Rubber latex contains rubber in such a unique condition that I believe the new interest now aroused in rubber latex will not only be a great force in this development of paper-making, but also to the use of rubber latex in other industries.

"It is such a wonderful natural solution of rubber—where we may have 30 per cent to 35 per cent of actual rubber content and yet have a perfectly limpid liquid, miscible with water in all proportions. The minute particles of liquid rubber globules are so small that they are seen to be dancing with the Brownian movement when examined with a powerful microscope.

"The rubber of commerce, as you all know, is coagulated on the plantation, or in the forest, by chemical or natural means, and it reaches the industrial countries in crepe, sheet or block form. In this state the rubber has in a sense been imprisoned, and, before it can be used in compounding, it has to be broken down or released by heat and great mechanical force, and it is therefore doubtful if the rubber can ever be the same again after this drastic breaking down.

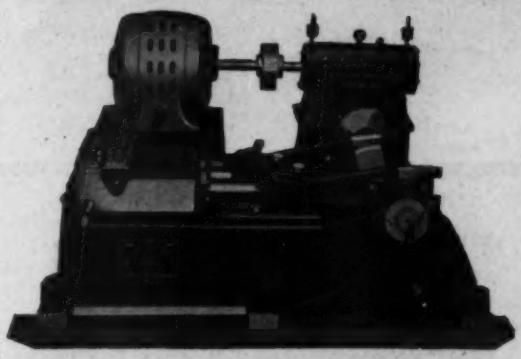
"By using rubber in the latex form we are able, with the utmost ease, to get the rubber perfectly associated with our material, such as paper-making fibre, without the expenditure of any mechanical or thermal energy upon the ultimate rubber particles.

"Some rubber manufacturers have put forward the objection that in rubber latex we have increased charges due to freightage, that is, in a 30 per cent rubber-containing latex, we have to import 3 tons of latex to get 1 ton of rubber. But, as I have just stated, we win great advantages by importing rubber in the latex form, because for our purpose rubber latex can be used as easily as milk is poured into tea. The only cost in its use in paper-making is the proper dilution and filtration if necessary when it is added to the beaten fibre in the beater. Over and against this we have in the case of coagulated rubber sometimes the washing of the rubber, but always the cost of the mechanical breaking down of the rubber before it can be compounded. This charge may be from ½d. to 1d. per lb., or say an average of £7 to £8 per ton. This will help to balance the increased charge due to the freightage on the greater bulk of rubber in the latex form.

"Considerable interest and experimentation are being given to finding the best method of preservation of the latex.

"Hitherto I have found that ammonia-preserved latex is

Cleveland
WORM GEAR
REDUCTION UNITS



Displacement 30 Gals. per min.@1500 lbs. per sq. in.—
30 Hp. Motor—750 R.P.M.
Displacement 20 Gals. per min.@2500 lbs. per sq. in.—
40 Hp. Motor—750 R.P.M.
No. 20-B Hydraulic Power Pump
Horizontal Triplex Type

Cleveland Worm Gear Efficiency

What about worm gear efficiency? The question is often asked us. Here is a report of a test recently made by C. L. Patterson, Chief Engineer of the Metalwood Manufacturing Company, Detroit, builders of high-pressure pumps.

Object: To determine the relative efficiency of their worm gear driven versus their spur gear driven pumps.

Test—Worm Gear vs. Spur Gear Drive

In connection with Electrically Operated Hydraulic Pumps Operating Under Same Load Conditions:

SPUR GEAR PUMP	WORM GEAR PUMP
Motor 30 Hp.	Motor 30 Hp.
R.P.M. 1200	R.P.M. 900
Reduction in spur gears 19¾	Reduction in worm drive 12⅓
Net overall	Net overall
Efficiency against water pressure Hp. column 54 6/10%	Efficiency against same water pressure Hp. column 72%

Net Saving in Favor of Worm Drive 17 4/10%

All couplings used in this test are flexible alignment couplings running in oil with encased sleeves. Triplex crank lubricated through special self-oiling rings.

If the Cleveland Worm Gear Reduction Unit can show such a saving in this installation, doesn't it suggest what it can do for you? Write, giving us data on your requirements.

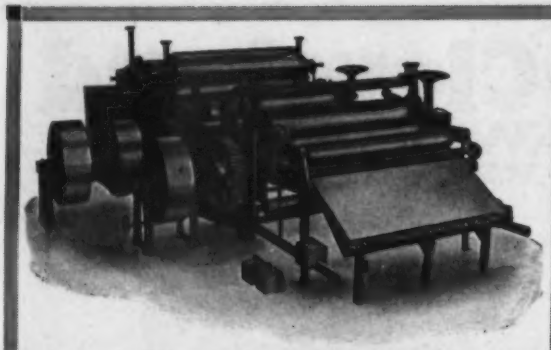
The Cleveland Worm & Gear Co.
America's Worm Gear Specialists
CLEVELAND, OHIO

BRAVO-DOYLE CO., Pittsburgh
Cleveland, Indianapolis, Philadelphia, New York

New England Representatives
FRANKLIN MACHINE CO., Providence, R. I.

Pacific Coast Representatives
ALFRED H. COATES CO., San Francisco, Cal.

Rocky Mountain States Representatives
THE VULCAN IRON WORKS CO., Denver, Colo.



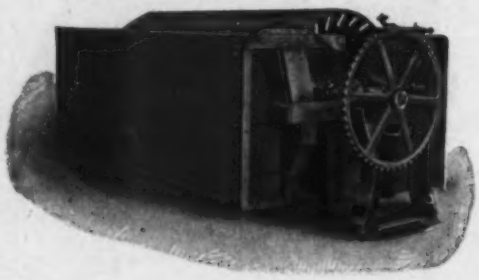
Rogers and Special Wet Machines

SINGLE AND DOUBLE PRESS
FOR CONVERTING CHEMICAL PULP INTO
SHEETS 48% DRY

25-30 TONS air-dry pulp per 24 hours. Built in 72" width only, with patented pulp weakening and separating device or our new automatic knife cut-off attachment.

FREIGHT CHARGES are greatly reduced. Savings on this item alone often pays for the machine in one year.

All infringements will be vigorously prosecuted



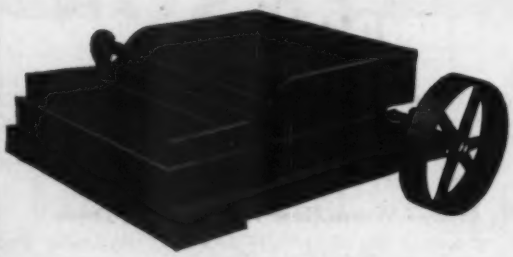
The Wood's Machine

Used as Pulp Thickeners, Savealls, Pulp Washers and Water Filters

ADVANTAGES:

Reduced Wire Costs	No Couch Roll
Enormous Capacity	Minimum Repairs
Only 2 H. P. Required	No Doctor
Works Automatically	Requires No Attention

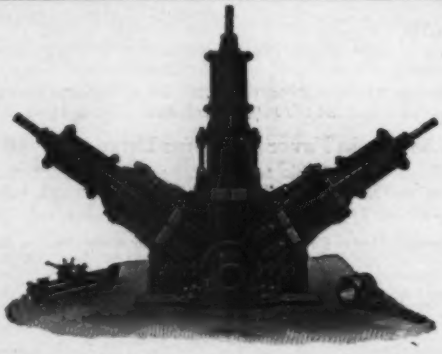
OVER 100 MACHINES SOLD AND IN USE



Wells Undulating Knot and Sliver Screen

Will bear closest investigation from every angle. It separates knots and slivers from all kinds of pulp efficiently, continuously, automatically with negligible cost for operation and upkeep. Simple but rigid construction. Only best materials used. Operation in plain view.

60 TONS DAILY CAPACITY, STANDARD SIZE. WRITE FOR BLUEPRINT AND FURTHER INFORMATION



Standard Wood Pulp Grinder

Built in Three Sizes

Taking wood 24", 30" or 32".
Bridge-trees—Are well proportioned.
Flanges—Made of steel, 40" diameter.
Hydraulic Cylinders—Copper lined, 12", 14" or 16" diameter.
Pillow Blocks—22" length of bearing.
Pockets—Very heavy and designed particularly for free discharge of pulp.
Service—Continuous distinctive service is always assured.

PULP AND PAPER MILL MACHINERY
GLENS FALLS MACHINE WORKS
GLENS FALLS, NEW YORK

best for paper-making because there is less agglutination of the particles by this method than any other. That is, the latex remains more perfectly fluid. I have brought home from abroad several varieties of latices preserved with ammonia without the addition of water.

The Method of Using Rubber Latex in Paper-making

"The use of rubber latex in paper-making is a comparatively simple process, but there is room for much experimentation in each mill as to when and how to add the latex in the beating engine, and as to the quality needed to produce the kind and quality of paper to be made.

"The great essential is the thorough dilution of the latex with water before addition to the beaten pulp. In this manner the latex quickly penetrates and becomes intimately associated with every particle of the beaten fibre. Experiments may be conducted, as when to add the latex to the fibre during the process of beating. I have usually found it best to add the latex towards the end of the beating process, because with the prolonged and severe beating to which some particularly strong fibres may be subjected they may be in a condition when some of the rubber will be thrown out in fine particles.

Effect of Rubber Latex upon the Paper

"The use of rubber latex in paper-making opens up some interesting problems for study and explanation.

"Rubber latex has some specific effect upon the fibres in the beating engine and upon the rate of hydration of the fibres. It is in this direction that the value of rubber latex as cheapening agent in paper production will be fully seen when large supplies of latex reach the paper-making countries, so that all phases of the effect of rubber latex can be explored in the mills on a wide and continuous scale.

"There is every evidence that rubber latex, even in small quantities, accelerates the rate of hydration. That is the time required for a certain stock to reach a certain grade of strength, and quality can be shortened.

"Sometimes a paper is made of remarkable strength but lacking in elasticity; then the right proportion of rubber latex will help in this case.

"A paper may be too weak or made largely of waste paper; here rubber latex will give necessary strength.

"The use of rubber latex in increasing the folding number is a very wide one for all grades of paper.

Experimental Results

"Practical commercial experiments in many mills have shown that all grades and qualities of paper can be improved in some regard by the use of rubber latex. Already commercial experiments have been arranged for in about 30 mills in England and Scotland, while many mills in the United States and in Canada are experimenting with rubber latex in the manufacture of their products. Experiments have been conducted in mills in Holland and Belgium, and arrangements are being made in the mills of Spain, France and Norway. The field is open for other countries in Europe as soon as adequate supplies of latex reach London.

"Experience shows that all kinds of fibres—vegetable, animal and such mineral fibres as asbestos—may be used in paper to which is added rubber latex. The paper mills have made paper containing rubber latex to give the finest qualities of cotton and linen papers, such as vellum and ledger paper, banks, etc. Various grades of tissue have been made and are being further experimented upon.

"Paper for electrical purposes and ammunition case paper has been made in quantities. Writing and printing papers of different qualities are being made, and arrangements have been arrived at to produce newspaper stock.

"Many kinds of wrapping paper have been manufactured, both made from entirely new fibre and wholly of very cheap waste. Experiments are proving that excellent results may be produced with waste paper, so it looks as if the value of this material for paper-making stock will be enhanced.

The World's Output

"I think we can modestly say that the world's output of paper is over 14,000,000 tons per year. The value of this tons of all kinds of paper per year. In Britain we produce £280,000,000, but the real value is, I think, higher than this, probably well over £300,000,000 per year.

"When the rubber interest joins up to such a giant industry we can perhaps a little realise the immense growing possibilities that open out to the joint efforts and enterprise.

"The application of rubber latex to paper-making will not only give a ready means of improving the quality of paper, but by the cheapening paper productions it will open out many new fields for the use of paper and thereby the paper industry will greatly prosper and benefit by the process.

Reclaiming Machinery

for the recovery end of soda and sulphate pulp mills, including:

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Send for list of Kraft mills using Swenson equipment.

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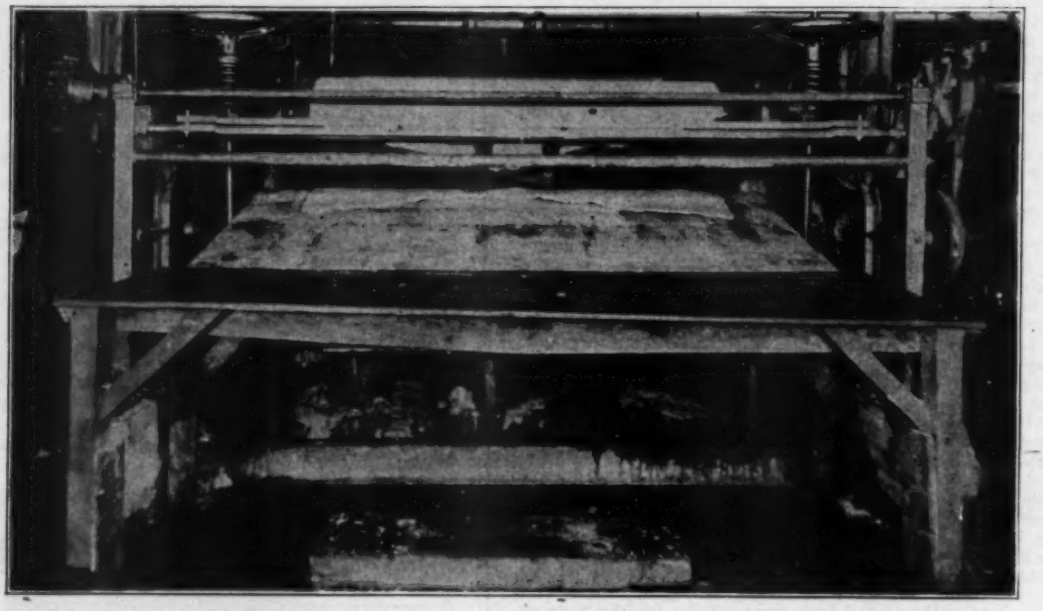
THE NORTH ROLL SKINNER

(Patent Applied For)



This picture shows a lap of hemlock sulphite being skinned off the roll by the North Roll Skinner

THE North Roll Skinner accomplishes what pulp makers have been trying to do for fifty years. It automatically cuts off or skins pulp laps at any **predetermined weight,** and every lap the same weight. Without human help, this skinner cuts any kind of pulp and cuts it every time.

The device consists of two sticks made of hard but not sharp material which rest at the ends of the top roll of any wet machine, and at a set thickness of pulp, move quickly to the center, meet and then move back again. On the way back the sticks lay the flat lap on the table or conveyor.

The North Roll Skinner will fit any wet machine and not mark the roll. It does not bear hard on the roll so as to wear out the felt.

One man can now fold for two wet machines and he doesn't tear any felts. **The felts saved pay for the Skinner.**

We also manufacture The North Save-All—The North Water Filter—The North Thickener and Washers—The Scott Shredder—Stuff Pumps—Gate Valves—Knives, Roll Bars and Bed Plates—Safety Guards (For Super Stacks)—Special Machinery and Castings (Grey iron and semi-steel).

Green Bay Foundry & Machine Works

GREEN BAY, WISCONSIN

"The United States of America produces about 7,000,000 tons of all kinds of paper per year. In British we produce somewhat over 1,000,000, so that the United States consumes much more paper per head of the population than we in Britain. This is partly due to the fact that the Americans print more voluminous newspapers, magazines, etc., but also because they have a greater regard for the hygienic condition in which food is delivered to the household. Every loaf of bread must be packed in a proctective covering of paper. This is a splendid contrast to the unsanitary methods in the delivery of bread and many other foods in Britain. When we get waterproof latex paper manufactured on a large scale in Britain I am hoping that the plantation industry and the paper-making industry will join forces, and through Parliament compel greater regard to the protective packing of food in our country.

In Conclusion

"When the success foreshadowed by the application of rubber latex to paper-making is fully culminated I trust it will stimulate the members of the Institution of Rubber Industry to further adventuring into the lands of pure science and industrial research. Following always the order of Nature, beauty, conditions and proceeds are all fruitfulness. The orchards are gardens of joys, the fields are seas of waving green long before the harvest and so the pure truth of science should be the first for which we crave, and in due time the wealth of productiveness will lie in our hands."

Discussion

In the discussion which followed this paper, there were many questions asked in regard to the practicability of the invention. In response to these questions Mr. Kaye brought out the following points: In mills where rubber latex has been used there has been no trouble experienced in repulping, that is, in using the broke off the machines. In regard to methods for determining the rubber content in a sheet of paper, he said there were several ways in which the paper was boiled with paraffin oil or benzine.

Rubber Latex in America

The question whether rubber latex is of great practical value for the manufacture of paper is being given exhaustive tests by governmental laboratories and by private paper mill research men as well.

The extravagant claims made of the value of rubber latex for paper, and known developments have led paper mill chemists to believe that it will be of value for some grades of paper. Some of the authorities, however, doubt that it will be as universally valuable as claimed by Frederick Kaye, the English engineer who invented this process and who has been largely instrumental in its promotion.

It is too early for any definite announcement to be made of the results of the American experiments.

The most exhaustive tests are being made by the paper laboratory of the United States Bureau of Standards, at the request of the Bureau of Foreign and Domestic Commerce. For the tests, a supply of rubber latex was secured by the paper division of the Bureau of Foreign and Domestic Commerce, and some of this shipment was turned over to private companies which wished to make experiments. A supply sufficient to warrant extensive exhaustive tests was provided the paper laboratory of the Bureau of Standards, which has a paper machine of its own, and complete auxiliary equipment for the making in laboratory quantities of any grade of paper. The Bureau of Standard officials, say they are as yet unable to make any report of the test.

The American attitude of this new discovery is well exemplified by William G. MacNaughton of this city, secretary of the Technical Association of the Pulp and Paper Industry, himself a paper mill chemist and engineer.

Rubber Latex Strengthens Sheet

"Any new discovery is followed by claims, frequently more or less extravagant," said Mr. MacNaughton. "This is probably no exception to the rule, though there is no doubt that there is some merit in the use of rubber latex, particularly for certain grades of paper. Personally, I doubt that it would be of value in newsprint, as Mr. Kaye claims, for it is at present costly, and it is a question whether the use of this material would result in saving elsewhere that would make it possible to keep the price of rubber latex newsprint to present levels.

"Rubber latex, it appears from the best knowledge that it is so far possible to obtain, may be of value of increasing the strength of any paper in which it is used. The use of latex in an addition to any substances now used means added strength, which of course means raising the paper in which

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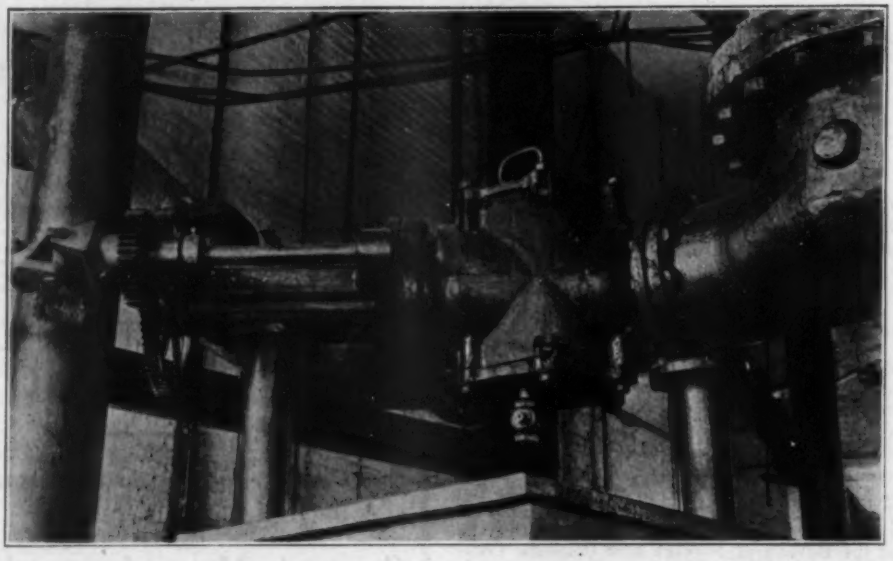
(PATENTED)



The above is an actual installation of a Horkman Valve in the Wisconsin Rapids Plant of the Consolidated Water Power and Paper Company.

Write for Specifications to

HENRY HORKMAN, Neenah, Wisconsin

it is used to a higher grade than such paper is now classed. It is doubtful if the use of latex would be practicable in the low grade papers. The chief value of rubber latex appears to be its strength giving quality, which is little questioned even by the most careful critics of new processes.

"Rubber latex might be of value in imparting strength to book, cover and similar papers. Paper receiving hard usage might be improved by the use of rubber latex, which would prevent the breaking when folded, for instance, it might be of value in making artificial leather."

Mr. MacNaughton pointed out, however, that his comments on the use of latex were merely based on the general attitude of the American paper mill chemists toward the new material. Its value because of its elasticity is not doubted for certain papers.

A question yet to be determined, however, and one which only time can answer, is the extent to which the use of rubber latex would affect the durability of paper. English critics have expressed a belief that the rubber latex would as in the case of rubber bands, be subject to deterioration with age. Tests of longevity will of course require considerable time, or at least intensive laboratory study under aging conditions resembling those due to the actual passage of time.

The research chemists of the mills which are experimenting with this substance are making no announcement of their discoveries, their work being reserved for the information of their own employers. The tests by the government's laboratory, however, will undoubtedly be quite conclusive as to the value of the latex. That it has value is not doubted, but the value in qauntiative comparative terms is yet to be determined.

Mr. Kaye has announced his intention of coming to this country to work with both the government and private laboratories, but no date has been set for his visit.

One difficulty in the use of rubber latex has been its high cost when laid down in the United States. This might be met by its use in quantities. In addition to the test shipment made to the government it is understood that large shipments have been made to American paper mills by various rubber importers, though most of these are for experimental use as yet.

Japanese Use Link-Belt Loader

Japanese engineers, selecting machinery for their purpose from Link-Belt publications, have made the novel application

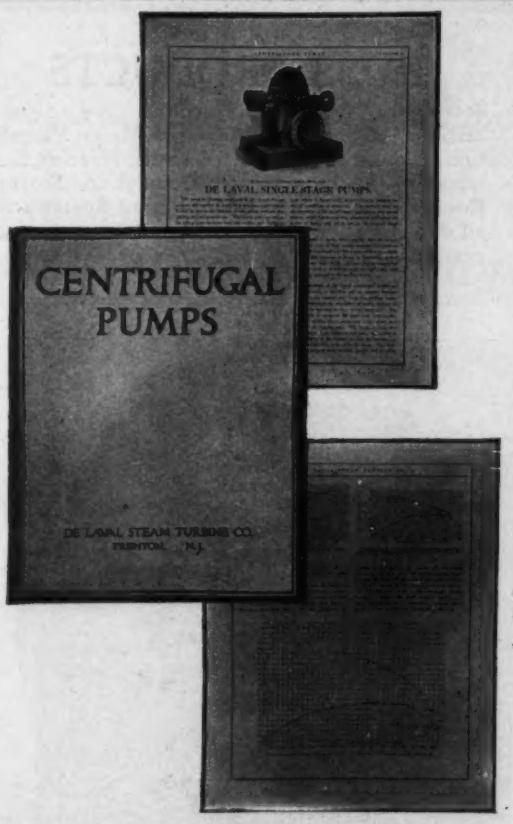
shown in accompanying illustration, for storing out and reclaiming their coal.

The coal is so largely of small size or slack, that using a Pratt Box Car Loader for building piles of coal, does no harm from breakage (as it might with high grade lump coal), and the combination of this machine with a Portable Belt Conveyor, makes a very flexible and satisfactory device for handling their coal to and from various parts of the yard as occasion requires.

Cast Steel Gate Valve

The Reading Steel Casting Company is at this time announcing their development of a new line of cast steel gate valves. This line has been designed for 350 pounds working pressure at a total temperature not exceeding 800°, or 500 pounds working pressure at a total temperature below 100°.

It is considered by the engineers designing these valves that steel, such as has been used therein is not only resistant to heat but is elastic and ductile. Its elasticity enables it to absorb sudden strains and shocks without permanent distortion, while its ductility allows permanent distortion without fracture when unforeseen loads impose stresses beyond the elastic limit.



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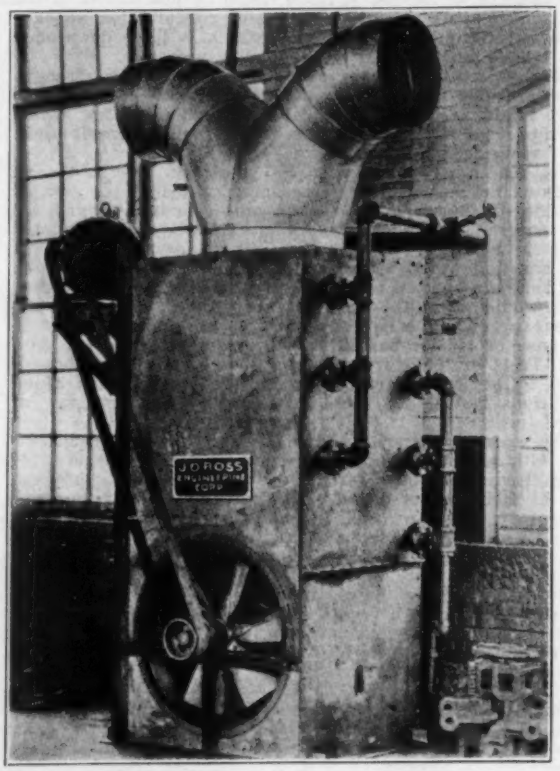
"BRINER ECONOMIZER" on roof of large Book Mill. The vapor from the machine hood passes horizontally through the machine while the fresh air supply to machine room enters louvres at top and passes vertically down into machine room, being heated by the escaping vapor instead of using steam.

An organization of experts who devote their entire efforts to installing every type of air system for Paper and Pulp Mills.



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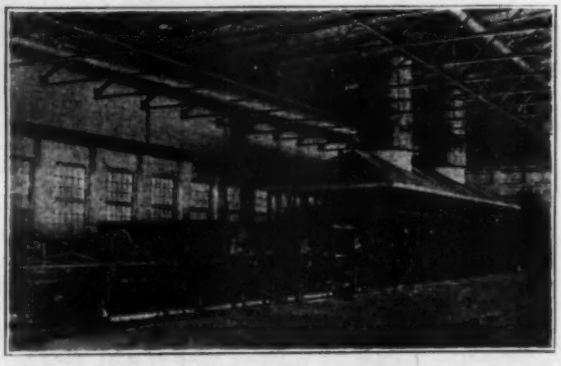

Oxford Paper Co., Rumford, Me., Book Machine hooded with Vent Stacks and Exhaust Fans. Warm air is introduced along roof and in pit.

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The Kamyr Pulp Pressmachine

By O. L. BERGER

IN THE manufacture of pulp it is necessary to employ large amounts of water as a carrying medium for the fibres thru the various stages of the process. After leaving the screens when the pulp is ready for the paper mill there are generally three hundred parts of water to each part of pulp. If the pulp is used directly by an adjoining paper mill it is customary to slush it to the beater room where it goes thru the process of paper making. But in case the pulp should be shipped as any other commodity it is of course essential to remove as much of the water as possible in order to save freight.

The Wet Machine

The simplest method of removing the water is the so called wet machine which generally consists of a cylinder mold and one or two presses. A woolen felt picks up the pulp from the mold and carries it thru the press rolls where the water is removed by pressure and the pulp delivered in sheets testing from 36% to 46% air dry. This pulp is generally called "wet pulp." If higher test is wanted it is customary to use hydraulic presses where the pulp sheets are stacked between square pieces of felt and wire matting and subjected to heavy pressure from a hydraulically operated plunger. In this way it is possible to obtain a test of about 56% air dry. The cost of pressing the pulp by hydraulic presses is in the neighborhood of $1.50 per ton. This pulp is generally called "pressed pulp."

The Drying Machine

If more of the water must be removed for long hauls, the only known way is to apply heat. This is done on a so called drying machine, which can be regarded as a wet machine, in this case called the "wet end" to which is added a plurality of drying cylinders. After the pulp leaves the wet end the continuous web is carried over the steamheated cylinders where all but 10% of the water is removed, the product being known in the trade as "dry pulp." Many mills are, however, not able to get this high test and ship their pulp containing up to 30% water.

Object of Removing Water

If the pulp is shipped as 'wet pulp," it is, of course, important to get it as dry as possible in order to avoid paying freight on water. This can readily be appreciated when we remember that 36% air dry pulp carries with it 3,555 lbs. water for each ton of pulp while 46% pulp carries 2,348 lbs.

In case the pulp shall be dried it is also very important to have the pulp leave the wet end as dry as possible as it takes 1.8 lbs. of steam to evaporate 1 lb. of water on the drying cylinders. The average machine used in this country delivers the pulp to the dryers testing from 36% to 40% air dry depending on the efficiency of the "wet end." It has long been the aim of pulp manufacturers both here and abroad to devise machinery which will remove a maximum amount of water by mechanical means. In the Scandinavian countries where during the war coal sold at $100.00 per ton this problem became of national importance as their revenue is to a large extent derived from the export of pulp. The old saying, "Necessity is the mother of invention" was again proven as the machine which was developed over there in this emergency served the purpose to a large extent. This machine is the so called Kamyr Machine.

This consists in its complete form of a suction cylinder mold with vacuum pump, two pairs of corrugated presses and a pulp cutter. The pulp leaves the mold testing 22% to 24% air dry. The first press brings this test up to 40% air dry and the second press to 55% air dry. The high test of the pulp leaving the mold 22% to 24% in connection with the special construction of the grooved or corrugated presses makes it possible to run the pulp thru the presses without the use of felts of any kind. The net result is that it is possible to have a continuous sheet of pulp produced, without felt expense, testing 55% air dry.

Since 1916 about 90 of these machines have been installed in Europe, and in September, 1922, the Chesapeake Corporation, West Point, Va., installed a complete wet end consisting of cylinder mold with a Nash pump and two pairs of presses as part of a 35-ton drying machine for sulphate pulp. This machine is now running successfully and the Chesapeake Corp., is no doubt willing to show the machine to any pulp manufacturer who may be interested in seeing it in actual operation.

Adaptation of the Kamyr Machine

As explained above the Kamyr Machine can be used either as a wet machine or as the wet end of a drying machine,

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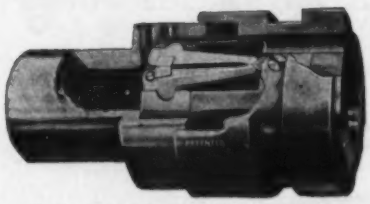

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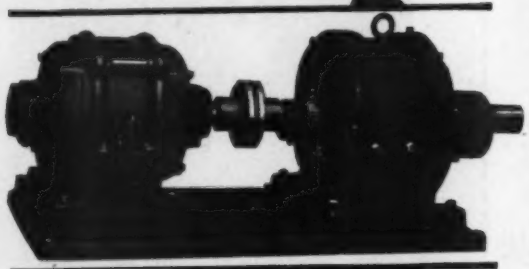

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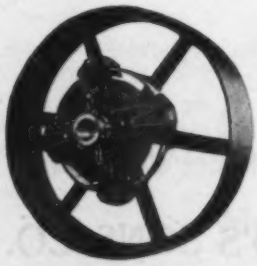

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Catalogues upon request

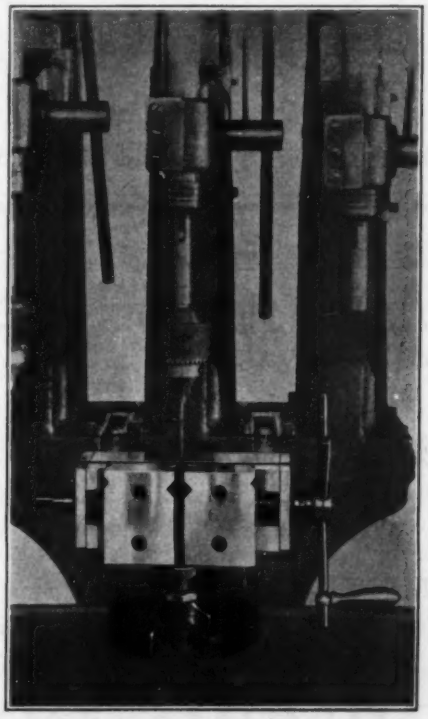
in either case furnishing pulp testing 55% air dry without felts. In case of drying machines already in operation it is possible to install one or both of the presses, thereby causing a large saving of steam, or saving felts and steam as the case may be.

If a mill is shipping wet pulp testing 36% air dry and the freight rate is 15c a hundred weight, the freight per ton on air dry pulp would be $8.33. If the air dry test is 46% this same freight is $6.52, while this would be reduced by the use of a Kamyr Wet Machine to $5.45. At the same time the felt cost, which in many cases runs up to 75c per ton, would be saved.

If one Kamyr press is installed in connection with an old drying machine, the saving in coal for drying can be estimated readily. The net weight of 1 ton pulp testing 36% air dry is 5,555 lbs. and at 55% this weight is only 3,636 lbs.—a difference of 1,919 lbs. The average drying machine uses, as mentioned above, 1.8 lbs., steam to evaporate 1 lb. of water and in this case the saving would be 1.8 x 1,919=3,454 lbs. steam per ton of pulp. Supposing the boilers evaporate 8 lbs. water per 1 lb. coal, the actual coal saving with a prevailing coal price of $7.00 per ton would be $1.50 per ton air dry pulp. If both Kamyr Presses are installed there would also be an additional saving of felts which amounts to at least 50c per ton.

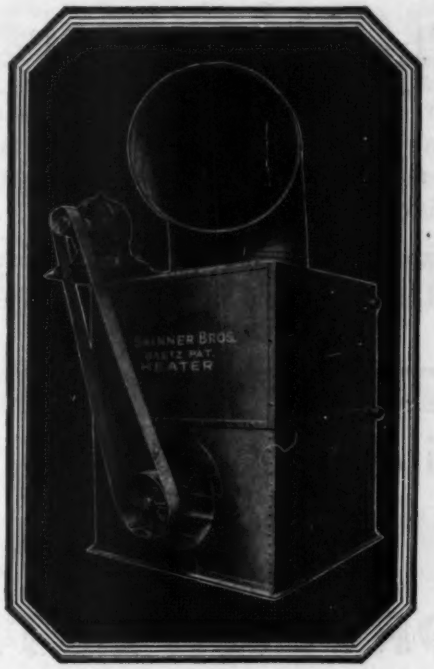
Chuck Designed for Drill Press

The John universal vise chuck, illustrated herewith, was recently brought out by the Barber-Colman Company, Rockford, Ill., for use on the drill press. The principle of the vise chuck is the holding or clamping of the work by the application of the quick-acting and self-centering chucking method.



The chuck consists of two jaws mounted and located by keys on cross heads with cap screws. Both jaws are operated by means of a screw having right and left-hand threads actuating the jaws simultaneously either toward or away from each other. This movement insures accurate self-centering in all positions. The screw is operated by means of a spider hand wheel on either end of the screw, whichever is most convenient. Quickness of loading and unloading are provided by he quick-acting screw vise, together with positive grip on the work.

Drilling, reaming, tapping, countersinking, centering, spotfacing, milling, hollow milling and grinding are some of the various uses that this chuck can be put to.



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If Not, Why Not?

Are You Interested in Accurate Running Felts?

Give Us a Trial
Get Authentic Information
Ask the Men Who Run Them

Yours for service
LOCKPORT FELT CO., Newfane, N. Y.

THE WATERBURY FELT CO.

SKANEATELES FALLS
New York

FELTS and JACKETS

Top and Bottom Wet Felts for board machines, with all the qualities requisite to insure long life and continuous production.

They Satisfy

STOWE & WOODWARD CO.

Newton Upper Falls, Mass.

Makers of Rubber Covered Rolls

Maximum Resiliency WITH Minimum Softness

Long Life

Paper Exposition Wheels in Motion

The Paper Industry Exposition will be conducted at the Grand Central Palace, New York, during the week of April 9th, 1923, by the International Exposition Co., with Charles F. Roth and Fred W. Payne as managers. This will be held during the same week as the meeting of the American Paper & Pulp Association, the National Paper Trade Association and other associations of the paper industry which meet at the same period.

The management whose office is in the Grand Central Palace, New York, has already announced that the diagram of space for the Exposition is open and that they are ready to receive applications. They state that the Exposition will tell the complete story of paper, starting from the forest where they dwell upon the care in forest use to prevent waste, to encourage reforestration of cut over lands to insure a supply of paper raw material for the future, the handling of the raw materials entering into paper and what they are, through the machinery with auxiliary apparatus and instruments with which the finished paper is made and the various products therefrom. Among the latter will be shown the newest products of the paper maker and converter. The Exposition will conduct an educational campaign and there is provision made in its program for the showing of motion pictures of the industry, and it is expected to have a program of experts to discuss paper making phases to schools and colleges; the students from the technical schools being admitted at certain definite periods during the week for the purpose of hearing the speakers and after the address or lecture to view the exhibits. The hours for the Exposition will be daily from noon to 10:30 p. m.

Though this Exposition will be the first of its kind its success is assured by the interest already shown by manufacturers who have asked for space. The success of the project can be further estimated by the successful exhibitions of paper making machinery, equipment and supplies, which the management of the Exposition have already given in the eminently successful Expositions of the Chemical Industries which they have conducted for many years and in which for several years they have had a special Section for the Paper Industry.

A strong committee has been organized for the Paper Industries Exposition comprising organized and unorganized groups of paper manufacturers, the trade publications, educational institutions, engineers and manufacturers of paper machinery, wires, felts, etc.

The committee as at present organized comprises Hugh P. Baker, Secretary American Paper & Pulp Association; H. J. Berger, Editor "Paper Trade Journal;" Chas. N. Bicknell, President, National Paper Trade Association; F. D. Cowdery, Albany Felt Co.; Joseph L. Fearing, International Paper Co. of Chicago; Hardy S. Ferguson, Paper Mill Engineer, E. B. Fritz, Publisher "Paper Industry;" Phil A. Howard, President American Paper Merchants; C. W. Hurtubis, Hammermill Paper Co.; Thomas J. Keenan, Editor "Paper;" Ralph H. McKee, Columbia University; John H. O'Connell, President, American Pulp & Paper Mills Supts. Ass'n.; Frank W. Power, Vice-President, National Paper Trade Ass'n.; L. D. Post, Pubr., "Paper Mill;" Walter J. Raybold, Pres., American Paper & Pulp Ass'n.; George W. Sisson Jr., Racquette River Paper Co.; E. C. Spear, The Cheney Bigelow Wire Works; Tom Walden, Editor, "U. S. Paper Maker;" George E. Williamson, Pres. Technical Ass'n. Pulp & Paper Industry; Louis E. Wise, N. Y. State Col. of Forestry; Fred. W. Payne and Charles F. Roth, managers.

Mullen Company Sold

The properties of the Mullen Brothers Paper Company were sold at public auction December 15, these properties being divided into four lots on which the following highest bids were received:

Land, buildings and equipment, including the entire paper mill, $65,000. Bid made by Francis Hughes.

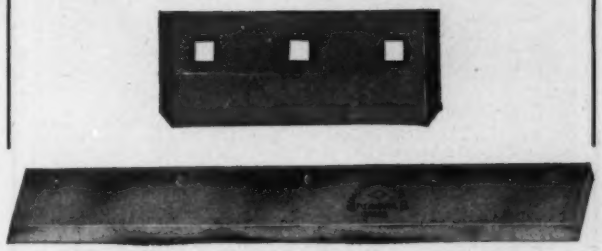
All raw materials and finished stock on hand, $5,000. Bid made by Francis Hughes.

The Mullen Company's equity in the E. A. Graham docks property, $2,100. Bid made by William A. Bastar.

The firm's receivable, patents and trade marks, $1,000. Bid made by Francis Hughes.

One of the large creditors of the Mullen Company, the Chicago Tribune, through their attorney, Victor M. Gore, entered a formal protest against the sale. In this protest it was declared that ample time had not been allowed after the announcement of the sale for the creditors to get together. The protest will be taken under consideration by Circuit Judge Charles White.

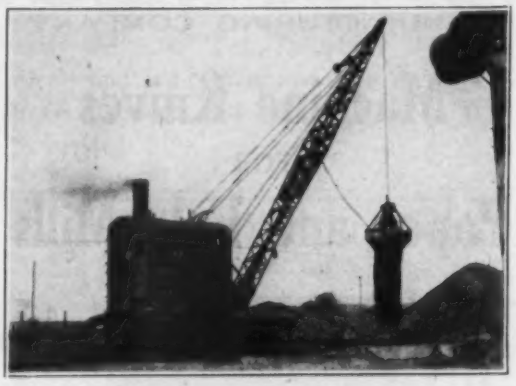
SIMONDS
MANUFACTURING COMPANY
Machine Knives
FOR
Paper and Pulp Mills



Highest Quality—Finest Steel—More Production
Write for Catalog and prices
SIMONDS MANUFACTURING CO.
Fitchburg, Mass. Chicago, Ill.

FLY BARS
of BRONZE
for Beaters
Will outlast steel bars 5 to 1
Will not discolor paper stock
Are tougher and stronger than steel
Will not corrode
Will save money in operating costs
Tensile strength, 75,000 lbs. Yield Point, 38,000 lbs. Elongation, 20% in 2 in.
Hy-Ten-Sl Bronze Bars for Jordan Engine Fillers
Outwear anything on the market, by a wide margin.
This metal is as strong as Nickel Steel.
Tensile strength, 110,000 lbs. Yield point, 60,000 lbs. Elongation, 12% in 2 in.
AMERICAN MANGANESE BRONZE CO.
Holmesburg—Phila—Pa.
NEW YORK OFFICE: Room 806, 59 Pearl Street

UNLOADED 18 CARS IN 3 DAYS



"Our 12-ton "INDUSTRIAL" Crane recently unloaded 17 cars of coal and one car of pig iron in three days, including changing from bucket to magnet and back again," writes Mr. H. O. Hart, Superintendent of the Grand Rapids Malleable Works. "Before we installed the Crane it took one man from 1½ to 2 9-hour days to unload one car."

This "Industrial" is saving this firm more than $13,000 per year. It also has time to do other work, such as a grading job, where the dirt was so full of slag that handling with shovels was almost impossible. To quote Mr. Hart again: "The Crane kept nine wagons busy making three trips an hour to a point four blocks away, and easily completed the job within the time desired.

Write for illustrated Catalogue No. 109

INDUSTRIAL WORKS

BAY CITY MICH.

BUYING

O. S. Dependable Cranes

AND

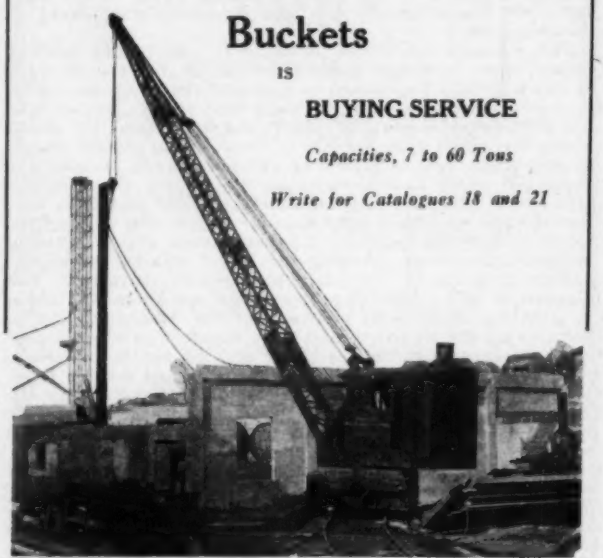
Buckets

IS

BUYING SERVICE

Capacities, 7 to 60 Tons

Write for Catalogues 18 and 21



Orton & Steinbrenner Co.

Offices CHICAGO, ILL. Shops HUNTINGTON, IND.

High Speed Newsprint Machines
166 inch wide, running at a daily average of over 1,000 ft. per minute, in mills of the Laurentide Company, Limited, Grand'mere, Que.
Built by
DOMINION ENGINEERING WORKS, LIMITED
Montreal, Canada

Builders of Fourdriniers for Fine Papers, High Speed Newsprint Machines, Cylinder Type Board Machines and Wet Machines for Wood Pulp; Millspaugh Suction Rolls, Pope Paper Reels, etc.
Canadian Builders of I. P. Morris Turbines and High Speed Pumps; Larner-Johnson Hydraulic Valves, Large Gate and Pivot Valves.

(M-82)

Nekoosa Edwards Paper Company to Expand

As soon as the severe winter weather is past the Nakoosa Edwards Paper Co. of Port Edwards and Nekoosa, Wis., will commence construction work on a new paper mill and warehouse building. These will cover nearly an acre of ground and are located between the present sulphite and paper mills at Port Edwards.

The new mill will house a new 132-in. Fourdrinier paper machine known to the paper making fraternity as a Yankee, and the present 110-in. machine at Nakoosa, which is known as No. 2. These will bring the Port Edwards production up to over 100 tons of paper per day. The 110-in. machine is the World's Fair machine made by the Beloit Iron Works and exhibited at the World's Fair in Chicago. The makers inspected this machine recently and pronounced it in such good condition that they would not recommend any major changes when moving it to its new foundations.

The first unit in the new mill will be ready for operation by July 1st, it is hoped, and the second one not later than August 1st. A second 132-in. machine of the Yankee type will grace the old foundations of the World's Fair machine at Nekoosa and is hoped to be in operation by Sept. 1st, 1923.

With the completion of these additions the total production of the Nekoosa Edwards mills will be in excess of 200 tons per 24 hours. The mills are already equipped to produce raw material for these new paper machines. Necessary boiler plants have already been installed. It is, therefore, only necessary to put up the new buildings and place the paper machines to complete the new mill.

These new machines will, no doubt, increase the pay rolls of the company by the addition of many new men not only for construction purposes, but for operation thereafter. An increase of 100 men is estimated.

The new machines were ordered from Beloit Iron Works and the new beaters from Valley Iron Works, both Wisconsin machinery builders of world wide fame. Everything of the latest type will be used in equipping the new buildings, making them not only the most up to date in the state, but very economical of operation as well.

The new paper storage building will have three floors and basement and will hold many thousands of tons of paper, should business conditions ever require such action.

In addition to the above installations, there will be added at Nekoosa a new 1200 H. P. hydro-electric unit and two Bleader steam turbines, one at Port Edwards and one at Nekoosa as auxiliaries with a capacity of over 3000 H. P.

American Papeterie Company Sold

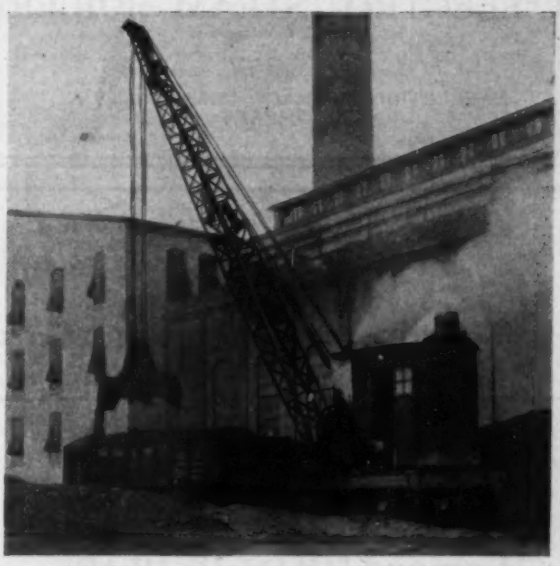
The trade will be interested to learn that the entire capital stock of the American Papeterie Company of Albany, N. Y., has been purchased from the United Drug Company, of Boston, by the Keith Paper Company of Turners Falls, Massachusetts, in conjunction with Edward H. Bridge and those associated with him in the management of the business.

In the spring of 1920 the business was purchased by the United Drug Company to insure adequate manufacturing facilities for their stationery lines. During the past few months Edward H. Bridge, who has been one of the officials of the American Papeterie Company since its organization, entered into an arrangement with the Keith Paper Company whereby negotiations were opened by the associated interests to buy from the United Drug Company the stock of the American Papeterie Company. This purchase, as noted above, was recently consummated.

The closer relationship effected between the two corporations; which will mean direct contact at all times and mutual co-operation will, it is thought, insure to the customers the utmost degree of high quality and efficient service, together with the lowest possible prices compatible with the character of the merchandise and good business policy.

The officers of the corporation are: Edward H. Bridge, President; Albert R. Smith and Edward G. Spatz, Vice Presidents; W. N. Tufts, Secretary and Treasurer. The business will be continued under the corporate name of the American Papeterie Company, the factory and main office being located at Albany, New York.

The West Coast Pulp and Paper Company are making plans to build a new paper mill at Olympia, Washington. The mill will occupy the buildings of a large dismantled brewery, to which will be added about $1,000,000 worth of improvements and equipment. Officials of the company expect the plant to be in operation by the first of next year. The West Coast Pulp and Paper Company has been organized by the same interests that own the Hawley Pulp and Paper Company at Oregon City.



Our Best Labor-Saving Device

Writing us recently the president of the Kalamazoo Vegetable Parchment Co. said, "We appreciate very much the receipt of your catalog, as it gives us a good many ideas which we will undoubtedly incorporate into our new mill.

"We are mighty glad to know that you make other things beside locomotive cranes, one of which we purchased from you some years ago, and which we have found in every respect the best labor-saving device that we have about our entire plant."

If you are interested in the handling of materials we want to remind you that Brownhoist is also interested in this subject. Over 40 years of engineering and crane building experience can be yours on any handling subject. And perhaps we can give you some valuable information, as we did the above company.

The Brown Hoisting Machinery Co.
Cleveland, Ohio

Branch offices, New York, Pittsburgh, Chicago, San Francisco and New Orleans

BROWNHOIST

"ELECTRO" STEAM BOILER
(Kaolin Development)
100 KVA (10 B.H.P.) to 34,000 KVA (3400 B.H.P.) in daily use.
Larger or smaller units supplied.
ELECTRIC FURNACE CONSTRUCTION COMPANY
908 Chestnut St. Philadelphia, Pa.

Steel Plate Construction
Steel Storage Tanks, Blast Furnaces, Gas Holders
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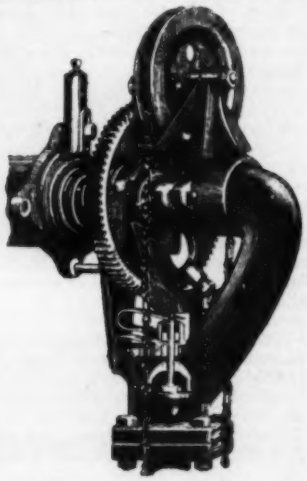
BROWN-WALES CO. SELAW IRON & STEEL
"Headquarters in New England" for **IRON AND STEEL and Kindred Materials**
Immediate Delivery
Distributor for Armco Iron
BROWN-WALES CO., Boston 9, Mass. 261 Broadway, N. Y. C. 55 Church St., New Haven Bangor, Maine
BARS — SHEETS — STRUCTURALS

Automatic Valved Soot Blowers

Diamond "VALV-IN-HEAD"



As with previous mechanical soot blowers, the use of the Diamond "Valv-in-Head" effects a saving of 4 to 8 per cent fuel and increases overall boiler efficiency.
As compared to previous mechanical soot blowers the Diamond "Valv-in-Head" also possesses the following distinct advantages:

1. LABOR FOR OPERATION—A saving of approximately 50 per cent.
2. STEAM FOR OPERATION—A saving of 50 to 60 per cent or more.
3. PIPE, VALVES AND FITTINGS—A saving of 50 to 66 per cent in cost of pipe valves and fittings.
4. MAINTENANCE—A reduction in annual charges of 25 to 50 per cent or more. Practically complete elimination of condensate obtained.
5. EFFICIENCY—Greater cleanliness of boiler assured.

One of the most interesting publications in the power plant field is yours for the asking. It describes the savings effected by Diamond "Valv-in-Head" soot blowers in detail.

Ask for your copy of Bulletin 297

DIAMOND POWER SPECIALTY CORPORATION Detroit-Michigan
Diamond
Soot Blowers - Save 4 to 8% Fuel

WE-FU-GO AND SCAIFE
WATER PURIFICATION SYSTEMS SOFTENING & FILTRATION FOR BOILER FEED AND ALL INDUSTRIAL USES
WM. B. SCAIFE & SONS CO., PITTSBURGH, PA.

A newsprint mill with a yearly capacity of 146,000 tons will be built at Humbermouth, N. F., within the next two years. The development of water-power resources, which amount to 250,000 horsepower, will begin immediately. A large British concern, the W. J. Armstrong Whitworth Company, will have full charge of the development of the water power and the construction of the newsprint plant. Bonds to the amount of 4,000,000 pounds sterling have been issued to cover the cost of the project. Half of this sum has been guaranteed by the British government and the other half has been underwritten by the Newfoundland government.

The stockholders of the Consolidated Water Power and Paper Company, Wisconsin Rapids, voted to increase their capital stock from $1,600,000 to $6,400,000 and to distribute the new shares as a dividend. This action was decided upon at a meeting held by these stockholders December 27, and is reported due to the fact that the face value of the old stock did not properly represent the real value of the several large properties now owned by the company. George W. Mead is president of the company.

A new company composed largely of the stockholders of the Thilmany Pulp and Paper Company has been organized at Escanaba, Mich., under the name of Thilco Timber Company. It is believed that the Thilmany Pulp and Paper Company will make use of the 2,000 acres of timber land owned by the new company. William Boniface of Escanaba, Mich., is president of the new company; Karl Stansbury, vice president; M. J. Rice, secretary; George J. Stansbury, treasurer.

Word has been received to the effect that the Mountain Mill Paper Company of Lee, Mass., have removed their general sale offices from the mill at Lee to New York City, room 709, 110 East 42nd Street. Mr. Louis T. Stevenson, president of the company, will have direct charge of the office.

The Hawley Pulp & Paper Company of Oregon City will build another unit to their plant at a cost of $1,500,000. It is estimated that this addition will add approximately 80 tons daily to the capacity of the mill. An additional 1,500 H.P. will be required to operate the mill.

The stockholders of the Neenah Paper Company, Neenah, Wis., at a meeting recently held decided to increase the capital stock of the company from $400,000 to $1,000,000. This stock will consist of 1,000 shares of par value at $100 per share.

Application has been made to the County Chamber of Commerce of Fresno, Calif., for a fifteen acre site on which to erect a $500,000 paper mill. Plans for the erection of this mill are in the hands of A. H. Dougall of Burlingame. Calif.

The Ogdensburg Paper Mills, Inc., Ogdensburg, N. Y., are putting up a new mill at Ogdensburg, costing $750,000, controlled by Stuart D. Lansing of Bagley & Sewall, Watertown, New York.

The American Pulp and Paper Mills Superintendents' Association will hold its 1923 convention at Springfield, Mass., May 31, June 1 and 2. Jack W. White, speaking in behalf of the Springfield Chamber of Commerce extended the invitation.

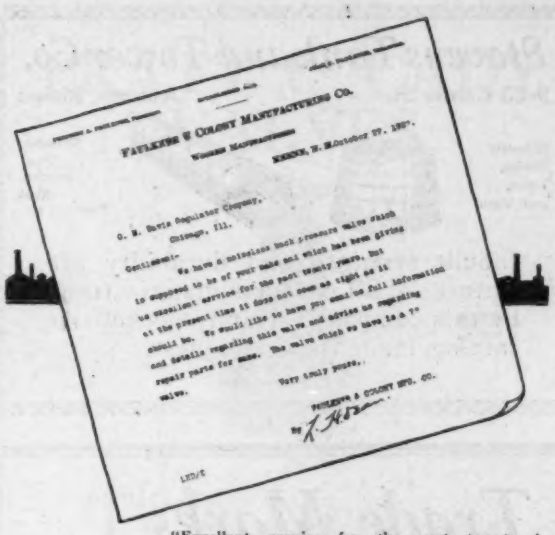
The National Paper Products Company of Stockton, Calif., is spending approximately $40,000 on improvements and additions to their present manufacturing facilities. The plans for this work were developed by V. D. Simons of Chicago.

The Ideal Corrugated Box Co. of Parkersburg, W. Va., is planning the immediate expansion of their plant by the erection of a large addition. Property adjoining their present building has already been purchased and plans made.

The Peshtigo Paper Company of Ptotato Rapids, Wis., recently made arrangements to secure electric power up to a maximum load of 3,300 H.P. from the Wisconsin Public Service Corporation. A ten year contract has been made.

The Oswegatchie Paper Co., Inc., Natural Dam, N. Y., are preparing to put up a new paper and pulp mill. Mr. C. E. Eaton is the hydraulic and construction engineer in charge. His address is Trust Bldg., Watertown, New York.

The Oglesby Paper Co., Middletown, Ohio, are putting up a large new warehouse.


FAULKNER & COLBY MANUFACTURING CO.
KEENE, N. H. October 27, 1922.
G. M. Davis Regulator Company,
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Gentlemen:-
We have a reducing back pressure valve which
is supposed to be of your make and which has been giving
us excellent service for the past twenty years, but
at the present time it does not seem as tight as it
should be. We would like to have you send us full information
and details regarding this valve and advise us regarding
repair parts for same. The valve which we have is a 7"
valve.
Very truly yours,
FAULKNER & COLBY MFG. CO.

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Pressure Regulators
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—and others

"Excellent service for the past twenty years"—now, after a few minor repairs, good for years more of service; that is the record of this Davis Back Pressure Valve.

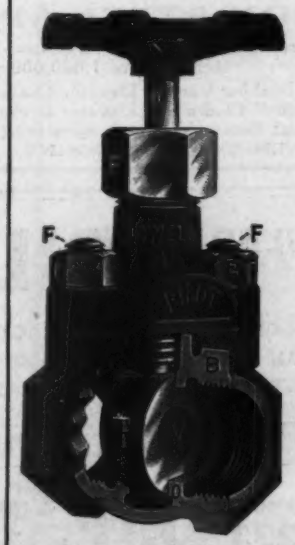
This record is representative of the service given by the entire line of Davis Valve Specialties. It is only one more proof that Davis Specialties should be installed where unfailing service throughout an unusually long life is desired.

Write the G. M. Davis Regulator Co., 414 Milwaukee Avenue, Chicago, for the new catalog.

DAVIS VALVE SPECIALTIES
STEAM SAVERS SINCE 1876

POWELL VALVES

"Pilot" Gate Valves



All iron or iron body with steam bronze trimmings. Simple in construction.

Economical and Reliable

Avoid disappointment in Valve Service by specifying POWELL VALVES

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Wooden Tanks, Tubs, and Vats

Wooden Pen-stocks, Acid Towers, etc.

Inbuilt strength and durability are features of all products manufactured by this company. Handy pocket size catalog mailed upon request.

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Are Good After 30 Years of Service

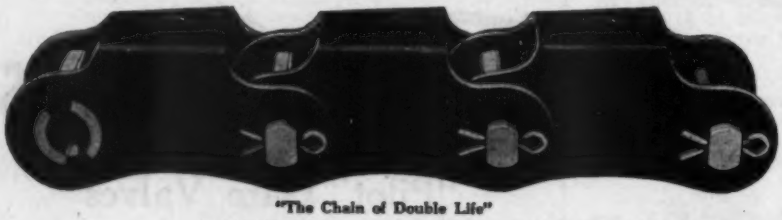
Many of our tanks built of Genuine Red Gulf Cypress are still on duty after giving more than thirty years of satisfactory service.

We carry no tanks in stock—all are accurately made to order for your special purpose.

Our Slogan—"Satisfied Customers Only"

Write today for information that should be in your possession. This is a part of our Co-operative Service.

Pittsburgh Office
506 BAKEWELL BLDG.



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Why Double Life?

When the pins and bushings in Union Steel Chains are considerably worn on the one side they can be turned half a revolution, thus bringing their unworn sides into service and practically renewing the chain; later they can be replaced with new wearing parts at small expense. Union Steel Chains invariably give longer service per dollar of cost; that's why they are used by the leaders in all industries.

UNION STEEL SPROCKET CHAINS

The chains with the substantial links and large case-hardened bearings. All sizes and capacities from one-inch pitch to 1,000,000 pounds ultimate strength.

Roller Chains; Bushing Chains; Elevator Chains; Conveyor Chains; Barking Drum Chains; Monel Metal Chains and Elevator Buckets; Cast Tooth Sprockets; Cut Tooth Sprockets; Renewable Tooth Sprockets; Elevating and Conveying Machinery

THE UNION CHAIN & MANUFACTURING COMPANY SANDUSKY, OHIO, U. S. A.

Registered UNION Trade Mark

RETURN TUBULAR LOCOMOTIVE **BOILERS** WATER TUBE SCOTCH MARINE

A LARGE STOCK OF HIGH-GRADE BOILERS OF PRACTICALLY ALL SIZES, TYPES AND MAKES, TAKEN OVER FROM DU PONT CHEMICAL COMPANY'S AND OTHER PLANTS WITH PRODUCTION RECORDS — RECONDITIONED, OFFERED SUBJECT TO ANY INSPECTION, AVAILABLE NOW!

"SAVE TIME AND MONEY ON YOUR POWER INSTALLATION — LET DAVIS FURNISH THE BOILERS"

LONG DISTANCE TELEPHONE
RANDOLPH 2233

J. F. DAVIS

1122-1123-1124 HARRIS TRUST BUILDING
CHICAGO, ILL.

The Gardner Harvey Paper Co. of Middletown, Ohio, are starting construction on a new plant attaching their mill, which will be used for making paper boxes. Mr. K. F. Vaugh of Hamilton, Ohio, is the construction engineer.

The Great Lakes Pulp and Paper Company will erect a $3,000,0000 plant at Port Arthur, Ont. Electric power will be furnished from the Provincial Hydro Commission.

The Halltown Paper Board Co. is planning to rebuild the portion of their plant at Halltown, W. Va., recently destroyed by fire.

The Calcasien Mfg. Co., Elizabeth, La., is making plans for the erection of a new mill to cost approximately two million dollars.

The Bastrop Pulp and Paper Co., Bastrop, La., is making plans to install the latest machinery for the manufacture of kraft paper.

Filer Fibre Co., Filer City, Michigan, are putting up a new paper and pulp mill. Mr. Max Oberdorfer is the general manager.

The Ft. Wayne Corrugated Paper Co., Ft. Wayne, Ind., are making an addition to their plant in Hartford City, Indiana.

Acme Trading Co., Bank of Montreal Bldg., Three Rivers, Quebec, is contemplating the erection of a pulp mill.

The Peerless Fibre Co., Cohoes, N. Y., will rebuild part of their mill burned out on November 4, 1922.

News Personals

Dobrow Resigns

M. C. Dobrow, statistician of the Writing, Book, Cover and Tissue Paper Manufacturers' Association, has resigned to become treasurer of Irving, Miller & Co., importers of general merchandise at 78 Fifth avenue, New York.

The resignation takes from the paper industry a man who in seven and a half years of work in the manufacturing associations has become favorably known to every manufacturer of fine papers, from his having risen through every department of the office of the fine paper associations. This experience has given him a knowledge of conditions possessed by few men in the paper industry. Mr. Dobrow's resignation took effect January 1, at which time he took up his new activities.

Lester E. Stewart, who was formerly for 15 years connected with the Peerless Trading Company, of Albany, N. Y., and who has an extensive acquaintanceship among paper and board manufacturers, has entered business for himself in Albany under the firm name of L. E. Stewart & Company, Ltd., packing and grading waste paper and other papermaking materials. The new company has ample warehouse facilities and intends to make a specialty of high class packing of old paper.

Castle, Gottheil & Overton, large importers of wood pulp and other papermaking materials of 200 Fifth avenue, New York, announce that their firm name has been changed to Castle & Overton, the change being occasioned by the death a few months ago of Leon Gottheil, a member of the firm. William A. Castle and Frank C. Overton continue as members of the firm.

A petition in bankruptcy was filed on December 18 against the E. R. Mosher Company, Inc., dealers in paper of 51 East Forty-second street, New York, by the Lynch Warehouse, creditor for $20; United States Trucking Corporation, $200, and the George H. Mead Company, $4,885. Judge Mack appointed Louis B. Wehle receiver under $25,000 bond. Liabilities were not stated, while the assets were placed at about $45,000.

S. Jacobson, formerly of Holland, is now in charge of the papermaking rag department of Rudolph Wolf, importer of 80 Wall street, New York. Mr. Jacobson's father, Louis Jacobson, is a member of the firm of Jacobson Bros., of Haarlem, Holland, and is secretary of the National Association of Waste Material Exporters of Holland. Mr. Wolf imports various grades of papermaking rags from different sources in Europe.

PRATT & CADY VALVES

THE Pratt & Cady line of brass and iron valves and asbestos packed cocks offers a valve for your every need where the working conditions involve pressures up to 250 lbs. and temperatures up to 500° F.; also hydraulic valves for pressures up to 800 lbs.

Reading Steel Casting Co., Inc.
Pratt & Cady Division
General Sales Office: Bridgeport, Conn.

Boston Cleveland Houston Philadelphia
Charlotte Detroit St. Paul Pittsburgh
Chicago Hartford New York San Francisco

TRADE JENKINS MARK Jenkins Bros

Years of Discretion

Early in their career, Jenkins Valves proved themselves to be thoroughly *good* valves. Since then they have proved themselves thoroughly *dependable* valves, by never once deviating from that standard of perfection.

Today, after fifty-eight years' experience, years of friendships made and kept, they are recognized as *the* valves of *the* dependable service.

Identified by the Jenkins Diamond Mark and Signature—at supply houses everywhere

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Jenkins Valves
SINCE 1864

SOLVAY

STANDARD IN
SODA
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Technical Association Papers, Fifth Series

This volume of 176 pages is one of the most valuable contributions to the literature of pulp and paper manufacture yet issued. The contents include the following articles besides a directory of the officers and members of the Technical Association and the list of committees:

The Power Plant of the Paper Industry, by A. G. Darling and H. W. Rogers.
A System of Records to Maintain Uniformity of Basis Weights of Paper, by Parker K. Baird.
Hydrating Machinery for the Paper Mill, by George L. Bidwell.
Modern Lighting for Paper and Pulp Mills, by J. H. Kurlander.
Some Factors Influencing Yield and Strength of Pulp Cooked by the Soda Process, by Martin L. Griffin.
Sedimentation Control of Groundwood, by W. A. Munro.
The Efficient Production of Mechanical Pulp, by Adolph F. Meyer.
The Drying of Paper, by M. B. Littlefield.
The Electric Steam Generator, by Horace Drever and Frank Hodson.
Recovery and Its Control, by George K. Spence.
Relative Efficiency of the Automatic Magazine Grinder as Compared with the Pocket Type Grinder, by John J. Case.
Stamso—Cotton Linter Pulp, by Stewart E. Seaman.
Analysis of Reclaimed Cooking Acid for Sulphite Mills, by Gösta P. Genberg.
Analysis of the Raw Sulphite Acid, by Dr. Rudol Sieber.
Concerning Lignin and Lignin Reactions.
Contribution to the Knowledge of the Constitution of Spruce Wood Lignin.
Contributions to a More Exact Knowledge of the Chemical Constitution of Spruce Wood. Three articles by Dr. Peter Klason, translated by W. E. B. Baker and Carl L. Fineman, by special permission of the author.
Use of the Continuous Centrifugal, by J. R. Kessler and G. N. Collins.
The Chemistry of the Sulphite Process, by R. N. Miller and W. H. Swanson.
Standard Methods of Testing Materials, by N. F. Becker.
Color Effect of Rosin Size Emulsion on Finished Product, by C. H. Kent.
Sulphur in Sulphite Waste Liquor, by George Barsky.
Producing Bleach Liquor with Liquid Chlorine, by S. W. Jacobs and H. P. Wells.
A New Idea in Chip Breaking, by A. D. Wood.
Fuel Economizers in Paper Mill Operations, by George E. Williamson and G. C. Derry.
A New Idea in Chip Breaking, by A. D. Wood.
Bibliography of Paper Making for 1921, by Clarence J. West.
Proceedings of the Annual Meeting, April, 1922.
Sectional Meeting on Dyestuffs.
Sectional Meeting on Paper Testing.
Sectional Meeting on the Drying of Paper.
Discussion of Various Papers Presented at the Convention.

The volume described is obtainable, on order, from the Technical Association of the Pulp and Paper Industry, 18 East 41st Street, New York City, at $3.00 per copy.

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Emergency Orders Receive Special Attention

Mr. Quincy P. Emery, formerly with Stone and Andrew, Inc., Boston, has announced his affiliation with the Kennelly Paper Company of New York. He has taken up new quarters in Boston to handle the company's growing New England trade. It is understood that a Massachusetts corporation will be formed to handle the business in that state. Mr. Emery will undoubtedly act as president of the subsidiary corporation.

E. Salomon, formerly vice president of the American Woodpulp Corporation, importers of wood pulp and other papermakers' supplies of 347 Madison avenue, New York, is no longer connected with that firm. It is understood that Mr. Salomon intends to return to the paper mill supply business on his own behalf.

Pagel, Horton & Company is the name of a new concern just organized and incorporated under New York State laws to deal in and import wood pulp. The corporation is capitalized at $350,000, and A. J. Pagel, E. M. Grant, Jr., and H. G. Wenzel were the incorporators.

The H. Fishman Paper Company, of New York City, was incorporated under New York State laws on December 30 to deal in paper with a capital stock of $50,000. H. Fishman, A. and A. Werner were the incorporators.

Frank O. Scott, recently elected state representative from the district of West Springfield, Mass., has resigned the position of superintendent of the Southworth Paper Company. Mr. Scott will be succeeded by Everett G. Ham, formerly of the Strathmore Paper Company.

Mr. C. H. Corrigan, manager of the Wabash, Ind. board mill division of the United Paper Board Company, has been advanced to the position of assistant sales manager of all the mills of the United Paper Board Company. He will have charge of the company's office in Chicago.

The Japanese Vice-Consul from the office of the consulate general in New York visited Portland, Me., during December for the purpose of sounding out the possibilities of direct trade in paper between Maine mills and ports in Japan.

Mr. J. B. Purvis, formerly of Port Arthur, Ont., has located at Wisconsin Rapids preparatory to taking up his duties as manager of the Biron mill of the Consolidated Water Power and Paper Company. Mr. Purvis succeeds Fred Eberhardt.

Mr. Edwin L. King has recently been appointed District Sales Manager for the Reading Steel Casting Company, Inc. Mr. King, who succeeds Mr. M. L. Chase, will have his headquarters at 208 South La Salle Street, Chicago.

After serving as general manager of the United States Envelope Company, Worcester, Mass., James Logan has been elected president of the company to succeed the late C. Henry Hutchins.

J. F. Patton & Company, wood pulp importers of New York City, have filed notice of a change in name to Mead, Patton & Company.

Obituaries

Thomas Harvey, Sr.

Mr. Thomas Harvey, Sr., veteran paper maker, died at his home in Middletown, Ohio, Thursday, Dec. 21st, 1922.

Mr. Harvey was born in England, March 13th, 1846, and served his apprenticeship in English paper mills. In 1872 he came to America, starting to work while they were building the old J. R. Walker Paper Mill at Burnside, Conn. He worked there for some time and at various other paper mills in New England.

About 1885 he went to Holyoke, Mass., working for some time in the Simms & Dudley paper mills, and later in the Valley Paper Co., leaving there in 1887 to go to St. Jerome, P. Q., to take charge of the J. B. Roland Paper Co., where he stayed for a number of years.

Later when the E. B. Eddy Co. changed their large pulp mills over to paper mills, he was hired to take charge of the work and was with the E. B. Eddy Co. for thirteen years, and was there during the fire that destroyed the entire plant, and in charge of the paper making end after it was re-built.

He came to Middletown in 1899 to take a position with the

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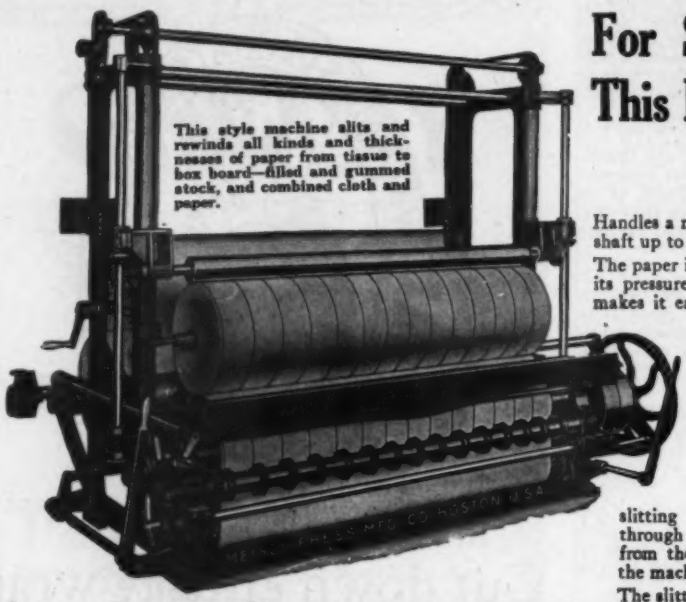

This style machine slits and rewinds all kinds and thicknesses of paper from tissue to box board—filled and gummed stock, and combined cloth and paper.

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Handles a mill roll up to 40 inch diameter and rewinds on one shaft up to 40 inch in diameter.

The paper is rewound by the use of three rolls; the top roll by its pressure gives compactness to the rewound paper roll and makes it easy to handle the poorest grades of paper without breaking. That serious defect in some machines arising from a one-side drive for the top pressure roll is wholly overcome by our double drive which gives uniform bearing on the rewound roll. This top pressure roll is easily and quickly raised for changing the roll by turning a crank. Counterweights can be increased or decreased in weight according to requirements.

Another prominent feature of this machine is its convenience. It has a device for separating the slitting cutter shafts to facilitate threading the paper through the machine. All adjustments necessary are made from the operator's place which is at the rewinding end of the machine.

The slitting cutters which are on parallel shafts give a clean, shear cut. The cutters may be quickly adjusted to different widths from 1¼ inch upward, and are clamped to the shafts with ample bearing surface so that they always run perfectly true.

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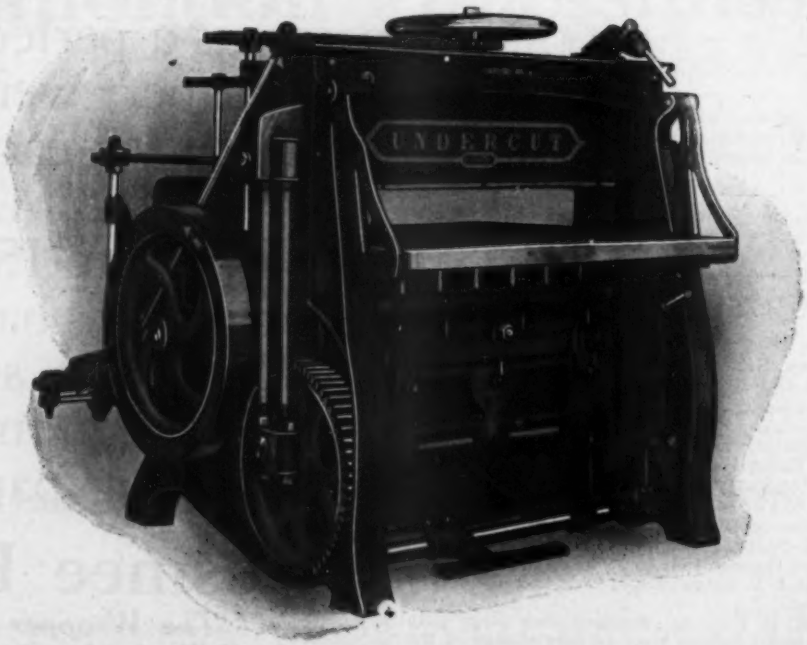

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Gardner-Harvey Paper Companies, and has been here ever since.

During the past year he has been quite ill, but was able to go to and fro to the mill until about a week before his death.

Besides a widow, he leaves two sons, Geo. H. and Tom, four grandsons and one great grand-daughter. The two sons hold prominent positions with the Gardner & Harvey Company.

Timothy H. Fowler

Timothy H. Fowler, aged 74, died December 23, at his home in Holyoke, Mass. Death resulted from a short illness with pneumonia. He had been treasurer of the Hampden Glazed Paper & Card Company, which was organized by his brother, George F. Fowler, in 1881. Since 1883 Mr. Fowler was the directive head and forward looking manager of the company which has prospered greatly and increased many times over its original size.

He was a trustee of the Holyoke City Hospital and of the Mechanics Savings Bank, director in the City National Bank, and a director of the Holyoke Public Library. He leaves a wife, who was Miss Harriet E. Delano of St. Louis, Mo., whom he married in 1897, two brothers, George F. and Norman N., both of Springfield.

Austin Smith

Austin Smith, well known paper manufacturer and vice president of the Wrenn Paper Company of Middletown, Ohio, died December 7 at Johns Hopkins hospital, Baltimore, Md., where he has been under treatment for several months. He was fifty years old at the time of his death and is survived by his wife and a sister, Bessie Smith.

Frank W. Fletcher

Frank W. Fletcher, founder of the Fletcher Paper Company of Alpena, Mich., died December 17, in Harper Hospital, Detroit.

Mr. Fletcher was 69 years old at the time of his death. He leaves an estate estimated at considerable over $1,000,000.

Fred A. Marsh

Mr. Fred A. Marsh, General Purchasing Agent of the Link-Belt Company, died very suddenly at his home in Chicago, on December 11.

William Currie

William Currie, a well known paper maker of Three Rivers, Quebec, died the latter part of December.

Volatile Solvents Discussed in New Book

The Chemical Catalog Company, Inc., 19 E. 24th St., New York, at this time distributing a book dealing with the Recovery of Volatile Solvents. This work has been prepared by Clark Shove Robinson, author of "Elements of Fractional Distillation."

Among the many applications of chemical engineering to the industries, that of the recovery of volatile solvents is among the most recent. In view of the newness of the industry it is therefore not surprising that there has so far appeared no book dealing exclusively with this important subject, but it is rather surprising to find that the technical literature is full of references to it.

The author has been able to make a search of the literature of the last forty years and has found, especially in the patent literature, a great mass of information to do with this subject, the greater part of which is included in the abstract of literature which goes to make up a portion of this volume.

He believes from his experience in this field, that this portion of the book will be of the very greatest aid to engineers in connection with their design of solvent recovery apparatus, especially in connection with the search of the previous art in making patent applications.

New Drive for Paper Machine

The power equipment of the Crown Willamette Paper Company's mill at West Linn, Ore., is described in a leaflet published by the De Laval Steam Turbine Co., Trenton, N. J. The interest of this installation lies in the fact that the separate sections of the paper machine are driven electrically by direct current motors. The relative speeds of the several rolls, as required to take up the "draw" or stretch of the paper, being maintained accurately by interconnected synchronous motors belted to the direct current motor shafts by adjustable cone pulleys.

The direct current generator driven by a geared turbine which supplies the power was originally designed to furnish the exhaust steam required by the paper machine. When delivering the amount of steam required by the latter, however,

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Reversible flat and roller platform
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Ability to lower on hoisting spindle as well as quick speed
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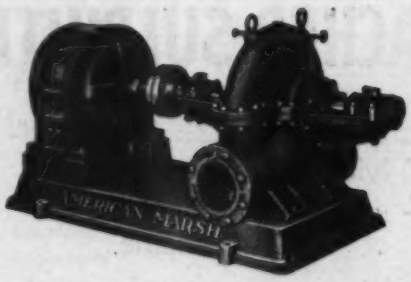
American-Marsh Paper Mill Pumps

Centrifugal and Direct Acting



ESPECIALLY adapted for paper mill service where absolute reliability and high efficiency are required. There is an American-Marsh pump for every paper mill requirement, from draining the rolls on the dryers to handling heavy paper pulp stock.

Because of the fact that the factory is located in the heart of the largest paper mill district in the world, we have always made a specialty of paper mill pumps and our designs are the result of careful first hand study of the actual requirements.

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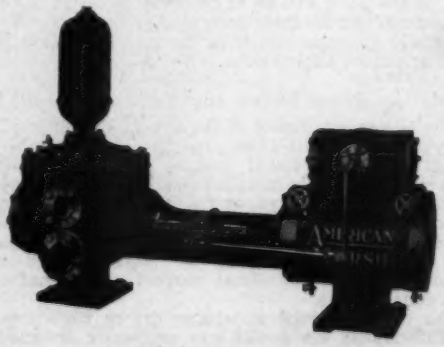

May we send you our general catalog?

American Steam Pump Company

Battle Creek, Michigan

it was found that more direct current power was produced than was needed, so an alternator has been coupled to the direct current generator to supply power to the remainder of the mill. The present leaflet describes the variable speed drive in detail, and should be of interest to engineers having similar problems.

Another leaflet published by the De Laval Steam Turbine Company describes the power equipment of the plant of the Marquette Cement & Manufacturing Company, La Salle, Ill. In this plant direct current is used for the operation of cranes, hoists, crushers and other machinery, and is found of particular advantage where variable speeds are required. The current is supplied by a direct current generator of 3750 KW. capacity, driven by a De Laval compound geared turbine. The latter has two shafts, the pinions of which drive the gear coupled to the generator shaft. This arrangement makes it possible to combine a large number of turbine stages, as required for high efficiency, with the advantage of short, rigid shafts. Cement dust and other impurities, such as water, sludge, and lint are removed from the lubrication system at the Marquette plant by a De Laval centrifugal purifier.

The Chain Belt Company, Milwaukee, announces the appointment of Fitch S. Bosworth as manager of the Chicago office, effective January 1st, 1923. Mr. Bosworth has been in charge of the Chain Belt Company's St. Louis office for the last three years and has specialized on chain and conveying engineering problems. With him will be associated Raymond X. Raymond, who for several years has been connected with the Export Sales Department in Milwaukee. Thomas F. Scannell, formerly of the Chicago office, has been placed in charge of the St. Louis office.

Announcements recently received here state that the Ingersoll-Rand Company and The A. S. Cameron Steam Pump Works have established a branch office at 718 Ellicott Square Building, Buffalo, N. Y. This new office is equipped to render full service to those interested in air, gas and ammonia compressors, vacuum pumps, turbo blowers and compressors, condensers, oil and gas engines, pneumatic tools, rock drills, centrifugal and direct-acting pumps and other of the numerous products manufactured by these companies.

According to a statement issued by the News Print Service Bureau nearly 6,000 forest fires were started in the national forests of the country during 1921. One fourth of these fires were caused by lightning while one third are directly attributable to the carelessness of campers. Brush burners, lumbermen, incendiaries and railroads are responsible for most of the remaining fires. Over 375,000 acres of national forest land were burned over with a total damage of more than $200,000.

Notice has been filed with the United States District Court of Western District of Pa., notifying creditors of the bankruptcy of the Union Paper Mill Company, Inc. A meeting of these creditors will be held at the office of the referee, 507 Washington Trust Building, Washington, Pa., on January 15. At this time the creditors will prove their claims, elect a trustee, examine the bankrupt and transact such other business as may properly come before the meeting.

"Plant and Products" is the title of a very handsome booklet recently published by the De Laval Steam Turbine Company. This publication carries the reader through the various departments of the plant wherein De Laval Steam Turbines are made. It also shows many installations of De Laval equipment.

The story is interestingly told and well illustrated.

Drying Machine Corporation of America, Inc., with offices at 52 Vanderbilt avenue, New York, announces that it has succeeded the H. P. Coe Drying Machine Corporation, formerly located at 50 Church street, New York, in its business, the ownership of its patents and other assets. H. P. Coe, the inventor of the original Multiple Deck Roller Drying Machine, is president.

The Kendall Engineering Corporation of Fort Wayne have placed on the market a new piston ring which they claim absolutely stops oil pumping. The manufacture takes a good deal of pride in making this announcement and feels that when the merits of the "Kendall" ring becomes known it will be in large demand among gas engine operators in the pulp and paper mill fields as well as in other industries.

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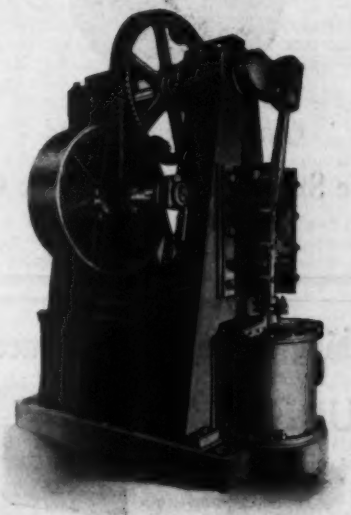

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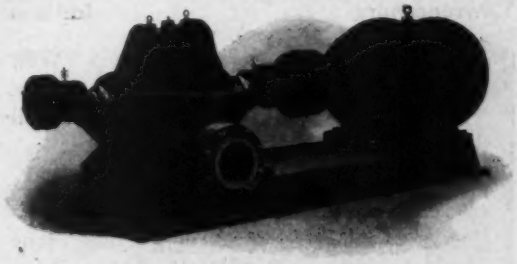

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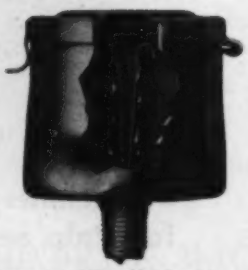

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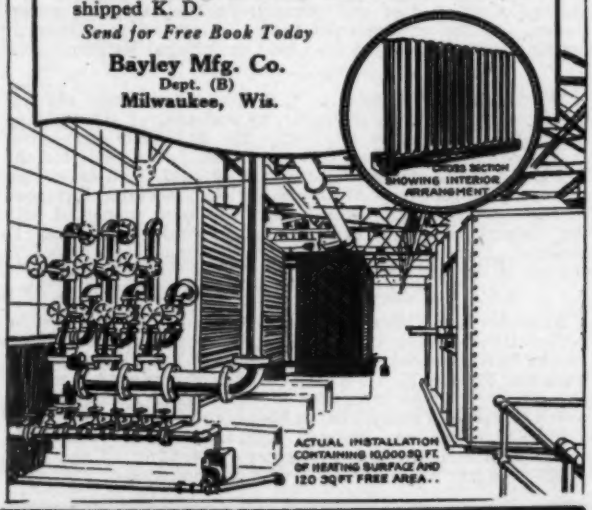
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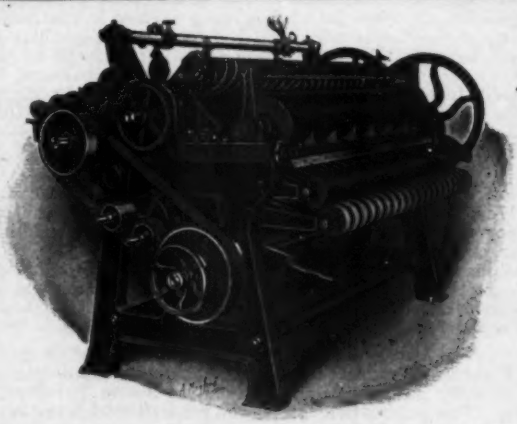
When the COOK Strainer is properly selected for the water bearing sand, capacity and method of pumping, it will successfully deliver the maximum yield of the well for many years free from sand and the troubles incident thereto.

Write for Bulletin 30A



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CUTTER KNIVES
PATENT TOP SLITTERS

Hamblet Machine Co.
LAWRENCE, MASS.

Co-operation and Costs*

By C. A. JASPERSON

President, Cost Association of the Paper Industry

AS THE incoming President of the Cost Association of the Paper Industry, I wish to direct my first message primarily to the chief executive or manager, and try to impress upon him the importance of becoming a member of this association, if he is not already a member, why his membership is necessary and what we hope to accomplish.

The question has often been asked, "What do I get out of the Association?" When an executive asks this question, I cannot help but feel he is looking at this important association work from a narrow viewpoint; either he does not understand or does not sense the ultimate results which are sure to be accomplished.

For the past twenty years the company with which I am connected has been interested in getting a system perfected which would not only show the total cost to make the various kinds of paper, but the cost per ton of each kind of paper made. I have spent a great deal of time and money visiting other mills, comparing systems affecting costs. Because the mills I visited had cost systems, I was under the impression most mills were more or less informed as to their costs.

Four or five years ago I became interested in cost association work and I soon learned I was mistaken in assuming all mills had at least the semblance of a cost system. When I found how small a number of the mills had an idea of what it cost them to make a particular kind of paper as it ran over their machines, I determined to give what time I could toward helping mills know their costs.

I believe the American manufacturer is what we term a good loser. When bids are asked on a particular kind of paper and a manufacturer secures the order, his competitors take it for granted he has taken the order on a basis which will net him reasonable profit. They can do nothing but sing his praises and assume he has secured the business on a legitimate cost basis. However, when it is later learned he had no idea of what it was going to cost to make that paper and he had taken the business on the assumption, "If the other fellow can make it for that, so can I," then it is that the "Milk of human kindness sours within our bosom." It is the purpose of the Cost Association to do what it can to teach the uninformed how to arrive at true costs and bid intelligently.

Education Needed

We have members in our Association who have good cost systems and because they feel that cost association work does not particularly interest them, think very little can be gained by sending representatives to attend conventions. Such mills are to be congratulated in having accountants who can perfect satisfactory cost systems. However, I wish to urge upon these mills the necessity for their continued support in the Cost Association work; the manufacturer who does not know his costs needs a campaign of education, as he is a constant source of annoyance because of the quotations he makes. We need the intelligent co-operation of every person engaged in this highly important work. The enthusiasm and interest in cost work and its direct bearing on the efficiency and prosperity of the paper industry as a whole, can best be obtained through such an organization as is now functioning. I am asking the aid of those leaders in cost work to attend our conventions, that we may all learn from one another.

I cannot put too much stress on the importance of getting support from the mill with a cost system, and the mill without a cost system, as it is only with proper financial backing that our organization will be able to send out accountants in an advisory capacity to give such help as is necessary to get mills lined up with good costs systems. This should prove constructive, as it will have a tendency to eliminate destructive quotations. Unintelligent bidding is apt to be disastrous for mills that are not equipped with good cost systems.

The President and the Executive Committee of this Association without expectation of reward, are giving their time and money toward developing this most important phase of the paper industry. The ultimate goal in mind is to teach true costs, thus eliminating unintelligent competition.

We are coming to realize that this program cannot be accomplished in a year or two, hence we need the continued support of all the mills in the paper industry. My personal plea is that we place the cost work on a higher plane than it has ever been before; to do this we must retain the mills that are now members and we need to urge the real advantages of our Association upon those mills that are not now affiliated with us.

*Inaugural message to the Cost Men of the Industry.

Superintendents Plan Busy Year

The officials elected at Rothschild by the Northwestern Division of the Superintendents Association of the American Paper & Pulp Association, realize the importance of their position and intend making their year not only a live one for the members but to set a high mark for future officers to aim at.

Already President L. E. Smith and Secretary Wm. Kraske, have been in conference regarding ways and means not only of keeping up the interest, but to make the Northwestern Division of greater value to its members.

Some plan of publicity is needed not only to keep the work before the superintendents themselves and to keep them active as members of the association, but to keep each and every member alive to his duties as members of one of the greatest educational possibilities there is in the American Paper & Pulp Association.

The officers were instructed at the Rothschild convention to name publicity and other committees. These will soon be named and meetings called for the choosing of the next meeting place, its program and other important work.

The next place will have to get busy to do better than was done at Rothschild by Roy Kelley and his committee of village folk and may find it difficult to find a location for the gathering where such up-to-the minute plants will be open for inspection and education.—B. T. McBain.

At their meeting held December 29 the Kalamazoo division of the Cost Association of the paper industry held their regular annual election of officers. The following were elected: President, George Ferguson, Watervleit Paper Company; vice president, Glen Ingling, Kalamazoo Paper Company; secretary-treasurer, Harry C. Bradford, Rex Paper Company.

The Mackay Wire Works is a newly formed Kalamazoo company. Mr. M. J. Mackay, a practical wire man from the East, is president of the company and states that he will specialize on Fourdrinier wires, save-all wires and wires for cylinder mould covers. Other officers of the company are: Wilfred Strong, vice president; C. B. Mackay, secretary; F. J. Buckley, treasurer.

New Straw Board Mill in Oklahoma

A new 50 to 100 ton capacity straw board mill is to be built at Blackwell, Okla., known as the Southwestern Straw Products Company. The construction of the plant will be under the supervision of Richard Clayton, formerly superintendent of the Kieffer Paper Mills, Ewing, Ind.

The new company will manufacture nine point board for corrugating and egg filler.

Pickles' Patent
Automatic Steam Regulator
FOR
Paper Making Machines

Which absolutely control the drying of the sheet. Installed on sixty days' trial

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Paper Mill Architect and Engineer
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WATER POWER DEVELOPMENT
DAMS, STORAGE RESERVOIRS AND OTHER HYDRAULIC STRUCTURES
STEAM PLANTS
Examinations, Reports, Estimates of Cost, Designs, Specifications, Valuations

New York, January 2, 1923.

PROBABLY not in a long time has a new year been ushered in which appears to promise so much for the paper industry of the United States as 1923. This new year starts with nearly every visible factor a favorable one for the paper industry. General business conditions are good and are undergoing steady improvement, there is that stability in market conditions and commodity prices which has not been recorded probably since prior to the world war, and there is a gradual growth in the public's confidence in business which can only lead to further increase in consumption of various commodities and a return to normal in the industrial and economic structure of the country.

Narrowing down the outlook to the paper industry, it must be said that 1923 seems to hold wonderful possibilities for paper manufacturers and merchants. It appears more than likely that new records of consumption of most kinds of paper will be established this year. If this proves true, it will mean, of course, that paper producers and dealers will experience a most prosperous and busy twelvemonth. Perhaps developments may arise before another new year rolls around that will put a damper on the consumption of paper, perhaps business in 1923 will not begin to approximate that anticipated by a large majority in the trade, perhaps even industrial conditions generally will become such that the present year will be less profitable for the paper industry than was 1922—these are things which are in the future and therefore cannot be foretold—but it can most assuredly be stated that the new year commences with every factor at present in sight a favorable one for the paper industry.

The steady increase in consumption of paper of practically all kinds in the latter half of 1922 seems sure to continue well into 1923. There are numerous indications that, as more advertising campaigns get under way, based on increased business activity in the various manufactured articles that are sold through advertising, publishers of newspapers, magazines and other periodicals will require larger amounts of paper, thus leading to a heavier consumption of news print and book papers. There are also plenty of indications that as industrial expansion keeps on, business concerns will need more bond and ledger papers for correspondence purposes, and as the general movement of merchandise broadens, larger quantities of wrapping and tissue papers and of box boards will be required for the wrapping and packing of goods. In other words, as the outlook for good business generally is so very favorable, it naturally follows that prospects for big business in the various kinds of paper are bright since demand for and consumption of paper is so dependent on the situations prevailing in the other basic industries of the nation.

No one in the trade is looking for any boom in paper. As a matter of fact, no one connected with the industry desires any boom. The present generation of paper manufacturers and dealers has experienced during and since the war all the booms—and their aftermaths—that it wants to witness for a long time to come. What is desired is steady business, of a healthy character. And this appears to be just what is likely to develop in the present year. Consumers have once again reverted back to a policy of buying as their requirements arise, thereby giving a very healthy tone to the demand. Jobbers are following the same procedure, and manufacturers are producing in the volume necessary to fill their orders, all of which lends a healthy aspect to the industry from the consumer to the producer. Users of paper apparently are aware that the mill capacity of the country is fully ample to take care of their requirements, and consequently are not likely to be led astray by buying ahead and piling up stocks which sooner or later can only harm the productive branch of the industry. Demand this year should be of broad proportions but at the same time healthy as well as steady in its development, such as manufacturers and dealers relish.

The last Federal Trade Commission report on the paper industry, covering the month of October, shows that a new high record of paper production for 1922 was reached in that month. A total of 644,267 net tons of paper of all kinds was produced by United States mills in October, which output was some 9,000 tons in excess of the previous biggest month's production for the year in August, and more than 21,000 tons above the next best month's production in September. October paper production was close to the monthly record of all time of approximately 657,000 net tons established during the boom period in 1920, and was no less than 101,000 tons in excess of the output in October a year ago.

Of even greater significance are the figures in the Commission's report relating to mill stocks of paper. Despite the big jump in production in October, mill stocks of paper declined appreciably during that month. At the beginning of October mills held 249,516 net tons of paper of all kinds, while at the end of the month stocks amounted to 239,833 tons, showing a drop of about 10,000 net tons. This means, of course, that manufacturers not only shipped out all of their production during October but also a part of their surplus stocks.

News print is in a very strong market position. Reports say that publishers who have recently been arranging contracts providing for 1923 deliveries have greatly increased the tonnage of paper ordered for this year, and it is stated on good authority that most news print manufacturers have disposed of practically all the paper that will likely become available over the next few months. The Federal Trade Commission's report on the print paper industry for November shows that domestic mills produced 127,983 net tons of total news print in that month, of which total 117,439 net tons were standard news. Production in November was 16 per cent above an average, based on reports covering the past five years, for total news print, and 18 per cent above an average for standard news.

The news price of 3.75 cents a pound or $75 per ton f. o. b. mills on standard news is now effective, this being a reduction of $5 a ton from the price prevailing during the greater part of 1922. The lower price seems to have stimulated contracting, and publishers all over the country are reported to have placed contracts for record-breaking amounts of print paper. So large a tonnage has been taken on contract, in fact, that it is said those consumers depending on spot purchases to cover their requirements are likely to experience difficulty in the next few months in filling their wants in the open market.

Book papers are moving in steadily increasing volume and at firm prices. The outlook for book paper is especially pleasing since consumption of this class of paper has not risen in recent months in like proportion to that of other kinds of paper, thus affording a broader scope for improvement, and the trade is expecting much for book paper in the new year. Fine papers are quotably firm and are wanted in good amounts. Wrappings and tissues have enjoyed a splendid pre-holiday season and are still moving in comparatively large tonnage.

Demand for paper boards is somewhat restricted at present but this is to be expected as this is the in-between season for box boards. Prices have moved down somewhat though the trend now is upward, due in large part to the rising tendency of raw material costs.

The Paper Industry of Sweden

In a recent issue of Commerce Reports there is an interesting summary of the history and present condition of the paper industry in Sweden. According to this article the Swedish paper industry dates back some four hundred years. It has not been until recent years, however, that it has taken its place with the leading industries of that country. And even more recently have Swedish papers taken a place of importance in international trade.

The mills of Sweden are thoroughly modern. The majority of them being operated throughout by electricity. At present there are 74 mills in Sweden with a total capacity of 400,000 tons of paper and 75,000 tons of cardboard. These totals include many varieties of paper such as newsprint, wrapping, parchments, smooth foolscap, writing, thin printing, colored tissue, crepe and wax tissue, affiche, catalog, envelope, sealings and toilet. And cardboards include leather board, duplex and triplex boards.

The Lawrence Pulp & Paper Co., Three Rivers, Quebec, is contemplating the erection of a pulp mill.

Largest producers in the world of highest grade Brimstone —guaranteed 99½% pure—free of Arsenic and Selenium.

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In so far as possible we will be glad to offer advice or suggestions to prospective buyers who are using or may be contemplating the use of brimstone.

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Corrugated Fibre Shipping Boxes and Packing Materials of Acknowledged Superiority

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MANUFACTURERS OF
Paper Makers' Chemicals
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SLAB ALUM

We are pleased to receive inquiries for Merrimac Slab Alum. This is manufactured in ingots, weighing about 42 lbs. Many paper companies prefer this form on account of ease of handling and general convenience.

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Stickle Compound Condensing System
and Automatic Steam Control
for Paper Machines

As shown in the folder we sent out to the mills—"*How to Dry Paper*"—showing our Compound Condensing System for draining the dryers and heating the air with the discharge from the dryers to condition the machine room should interest you. We guarantee a saving of 20 per cent in steam consumed for this purpose.

Open Coil Heater & Purifier Company
Indianapolis Indiana
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Papermaking Rags

Overshadowing all other features of the papermaking rag market is the strong position of roofing stock. There is no large demand for this class of material but the mere fact that some felt paper manufacturers have been in evidence as buyers recently has been sufficient to cause prices to stiffen to a pronounced degree and to result in at least a moderate advance. To say the least, it has been an exceptional development to witness prices of roofing rags moving upward during the final few days of the year. As a general thing this is one of the quietest periods for the roofing stock market, and values are invariably on the downtrend, but the entrance of certain consumers into the market as buyers in the last several weeks of December caused prices to quickly firm and to score some rise.

Apparently the sudden demand for roofing rags was due more to a desire on the part of some paper manufacturers to anticipate their wants and get in and cover at least a part of their requirements ahead of competitors than to any pressing need of rags. This would seem to be the case, though on the other hand it may be that those consumers who have been purchasing rags on a fairly large scale have been doing so because they have actually needed supplies. Whatever the reason, there has been a surprisingly good call for roofing rags, and prices are some $5 to $6 a ton above those prevailing only a short while back. Sales of No. 1 roofing stock have been made in New York at 1.25 cents per pound f.o.b. that city, and in the West even higher prices rule. No. 2 packing is reported freely selling to felt mills at around 1.15 cents a pound f.o.b. shipping points in the East.

The rather unexpected spurt of demand for roofing rags has brought out market characteristics which give the papermaking rag situation somewhat of a different aspect than previously prevailed. Developments during the past few days show that the rag market is very sensitive, that any show of demand from mills is enough to quickly strengthen prices, and furthermore that there is every likelihood of paper mills coming actively into the market for rag stock early in the new year. The sudden demand for rags in the final fortnight of the year indicates one of two things, that either paper manufacturers have permitted their stocks of rags to get down low or else that they expect to need considerable quantities of rags soon after a resumption of business following the holiday period and that some at least have been endeavoring to "beat the other fellow to it" by entering the market during the usual dull season to lay in supplies.

What is true of the low grades of rags, in which category come roofing stock, is doubtless also true of the better qualities of rags. If paper mills really are short of rag stock, it must be said that the outlook for the rag market is exceedingly bullish. It is generally conceded that domestic collections of rags throughout the country have not been up to normal for some months past, one of the principal reasons for this being that the rag industry has not fully recovered from the lengthy period of depression which drove many men out of the rag collecting business. Low prices in November and the first part of December also resulted in materially cutting down imports from Europe. Prices here worked down to levels where importers declared they could not bring supplies in from outside sources at a profit and therefore reduced their buying abroad. It is doubtless true that European dealers are holding fairly large stocks of rags, but proof is not lacking that they are insistent on at least certain prices and that they will not part with rags for less.

Aside from roofing stock, other grades of rags have shown little change and no great market activity in recent weeks. The strong position of roofing has had a sentimentally firming influence on other grades but buyers have been able to cover their wants at previous prices. New cuttings of all kinds are held with much firmness by dealers. This branch of the trade seems to be pursuing a waiting policy, confidently expecting a brisk demand from paper mills early in the new year and claiming that they cannot replace rags in stock at any cheaper prices and that therefore there is no incentive for them to reduce quotations to consumers. No. 1 white shirt cuttings are selling at from 11.50 cents per pound upward at shipping points, unbleached muslins at 10.50 cents, bleached shoe cuttings at 9.25 cents, blue overall cuttings at 6.75 cents and washables at 4.75 cents.

Old whites are quotably steady though now and then sales at slight concessions in price have been reported. Thirds and blues are moving only in routine quantities at prices ranging around 2.10 cents a pound for repacked and 1.60 cents for miscellaneous packing.

Chief activity in foreign rags has revolved about dark colored cottons for felt paper mills. Importers are asking at least 1.25 cents per pound ex dock for these rags and assert that the prices they are asked at primary sources frequently necessitate their getting higher figures from papermakers in this country.

Average quotations f.o.b. shipping points and ex dock are:

New Stock—	New York and Chicago
White shirt cuttings, No. 1	11.50-12.00
White shirt cuttings, No. 2	6.00- 6.50
Fancy shirt cuttings	6.25- 6.50
Washables, No. 1	4.75- 5.00
Unbleached muslins	10.50-10.75
White lawns	10.00-10.25
Overall cuttings, blue	6.75- 7.00
Black silesias	5.50- 5.75
Light flannelettes	9.00- 9,25
Canton flannels, bleached	9.75-10.00
Canton flannels, unbleached	8.50- 8.75
Shoe cuttings, bleached	9.25- 9.50
Shoe cuttings, unbleached	7.75- 8.00
Light silesias	7.75- 8.00
Linens, No. 1 white, foreign	13.00-14.00
Light prints, foreign	5.00- 5.25
Old Stock—	
Whites, No. 1, repacked	6.00- 6.50
Whites, No. 2, repacked	3.75- 4.25
Whites, house soiled	2.00- 2.15
Whites, street soiled	1.75- 1.90
Lace curtains	3.75- 4.00
Thirds and blues, rough	1.50- 1.65
Thirds and blues, repacked	2.00- 2.15
Black stockings	3.00- 3.25
Cotton canvas, No. 1	3.75- 4.00
White cotton batting	4.25- 4.50
Roofing, No. 1	1.25- 1.35
Roofing, No. 2	1.15- 1.25
Dark colored cottons, foreign	1.25- 1.35
Blue linens, foreign	3.50- 4.00
Grey linens, foreign	5.50- 6.00
White linens, foreign	9.00-10.00
Light prints, foreign	2.00- 2.25

Rope and Bagging

Reports generally tell of a moderately good demand from paper mills for old rope. There is little doubt that consumers are buying in lighter volume than they were a month or so ago, due to the inventory season and the common desire to keep stocks of raw material down at this time of the year, yet indications point to sufficient buying to absorb the great bulk of old rope offered, and prices are holding steady. About 6 cents a pound f.o.b. dealers' shipping points is the price generally paid for domestic manila rope in No. 1 condition, with here and there purchases recorded at a little under this figure. Dealers continue to put much emphasis on the small supplies of old rope coming forward from collection quarters, it being stated that nowhere near normal amounts are being received at present or have been received for some time past. Mixed strings are quoted at from 80 to 90 cents a hundred pounds at shipping points and are wanted only in routine lots.

There is very little life to the market for scrap bagging. Gunny bagging is moving fairly well and at steady prices of around 1.25 cents per pound for No. 1 domestic gunny, but scrap bagging has eased off to about $1 a hundred pounds with the probabilities favoring buyers getting some supply at even under this price basis. Whereas the present production of old rope appears below normal, available supplies of old bagging are in excess of the wants of users, which tells the story in so many words.

F.o.b. shipping point quotations follow:

Standard Ultramarine Blues
For the Paper Industry
ASK FOR SAMPLE OF
NEOS R BLUE
The Highly Alum-Resisting Ultramarine
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THE STANDARD ULTRAMARINE CO.
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For all grades of stock
PROMPT LABORATORY SERVICE
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OUR SOURCE OF SUPPLY IS
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MANUFACTURERS OF
Soda Ash 58%
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Special Alkalies
BICARBONATE OF SODA, U. S. P.
Our complete Works, located at Painesville, Ohio, directly situated on three Trunk Line Railroads, are in position to serve you to advantage.
Address inquiries and communications to our general offices at
PITTSBURGH PENNSYLVANIA

	New York and Chicago
Gunny, No. 1 domestic	1.25- 1.35
Gunny, No. 1 foreign	1.15- 1.25
Scrap bagging, No. 1	1.00- 1.10
Roofing bagging	.70- .80
Wool tares, heavy	1.40- 1.60
Wool tares, light	1.30- 1.50
Manila rope, No. 1 foreign	5.50- 5.75
Manila rope, No. 1 domestic	5.75- 6.00
Sisal strings	1.25- 1.50
Mixed strings	.80- .90

Old Paper

Probably the liveliest spot in the papermaking raw material markets during the past few weeks has been in the low grades of waste paper. This has been somewhat surprising in view of the reports of quietness obtaining among box board mills, which are the chief consumers of those grades of old paper that have been in leading demand. However, the movement of waste paper has assumed fairly broad proportions for this period of the year and the trend of prices has been almost steadily upward. The net advance in some of the lower qualities of stock since the first part of December has been about $5 a ton, which, it must be said, is an unusual occurrence for the last month of the year since that is a time when ordinarily board manufacturers are largely out of the market as purchasers of waste paper and when prices as a rule are tending downward.

Flat folded newspapers have been one of the strong items and this grade has sold on an upward scale until at least 1.30 cents per pound f.o.b. dealers' shipping points is regarded as the market level. Even at this price folded news is scarce. Dealers are under the impression that there will be a big demand for newspapers in January and are not entering forward commitments, choosing to dispose of merely such amounts of stock as become available from day to day. No. 1 mixed paper is firm at about $1 a hundred pounds at shipping points, with higher prices named in some quarters, particularly in the Middle West. Common paper is moving freely at around 80 cents a hundred pounds, and overissue newspapers are quoted at 1.50 cents a pound and higher.

No important change has developed in shavings. Dealers quote No. 1 hard white shavings at 4.25 to 4.50 cents per pound, and No. 1 soft white at an average of 3.50 cents. Heavy books and magazines are firm at 2.40 to 2.60 cents and old kraft paper is selling well at from 2.10 cents per pound upward with extra fine packing held at 2.25 cents.

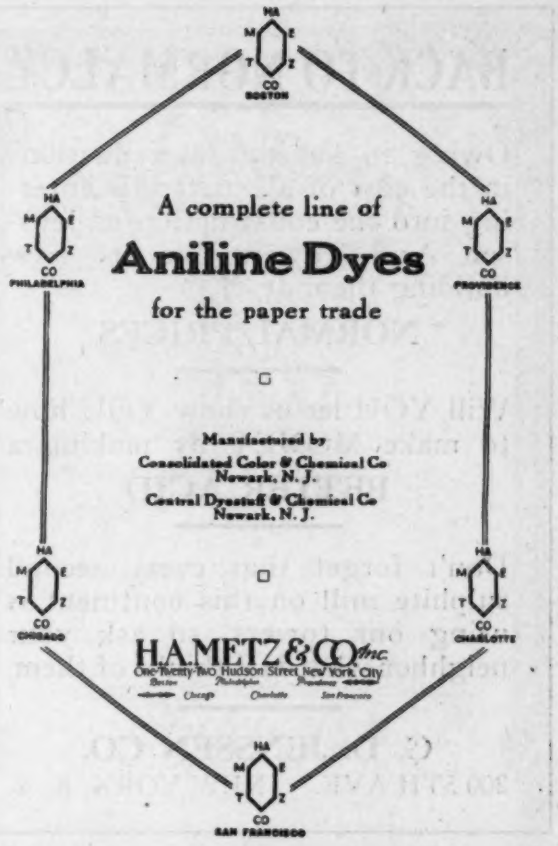
F.o.b. shipping point quotations are:

	New York and Chicago
Hard white shavings, No. 1	4.25-4.50
Hard white shavings, Nos. 2-3	3.50-4.00
Soft white shavings	3.50-3.75
Colored shavings	1.50-1.75
Heavy book, No. 1	2.40-2.60
Crumpled book, No. 1	2.00-2.15
Ledger stock	2.65-2.85
Kraft, No. 1	2.10-2.25
Manilas, No. 1	1.50-1.75
White blank news	2.15-2.25
Over-issue news, No. 1	1.50-1.60
Folded news	1.30-1.40
Mill wrappers	1.10-1.20
Box board cuttings	1.05-1.15
Mixed paper, No. 1	1.00-1.10
Common paper	.75- .85

Chemical Pulp

Demand for wood pulp has simmered down to a pronounced degree. It is nothing unusual for paper manufacturers to curtail their buying of pulp as the end of the year approaches and the past several weeks has witnessed no change from this customary policy, most consumers being more concerned about keeping pulp stocks down for inventory than in augmenting their holdings. The result has been that but occasional inquiries have been received by sellers and that business has been very spotty. Were it not for the continued good movement of supplies against contracts the market might well be described as quiet. There is, however, an exceptionally large tonnage of pulp being absorbed on contracts. Papermakers in numerous cases took care to cover their forward requirements some time ago by placing contracts with producers, and deliveries on these commitments are proceeding in a steady manner, so that the great bulk of pulp output at present is being moved without delay.

Prices are just a little softer than they were recently. It is natural for values to ease slightly when demand recedes and it is rather surprising that market levels have not de-



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SPECIAL SHADES OF COLORED PAPER OR SAMPLES OF DYESTUFF MATCHED AND COMPLETE FORMULAS FURNISHED

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Owing to substantial reductions in the cost of all materials entering into the construction of Jenssen Acid Towers, we are now building them at

NORMAL PRICES

Will YOU let us show YOU how to make MONEY by making a

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Don't forget that every second sulphite mill on this continent is using our towers, so ask your neighbor what HE thinks of them.

G. D. JENSSEN CO.
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Notice the heavy ship channels, pressed steel tire and gear saddles securely riveted to the channel sections and the substantial construction of the tires and gears in this Paulson Barking Drum. Is it any wonder that they stand the test? If interested in barking drums now, write us. You'll be satisfied with a Paulson drum.

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"Digester Makers Since '91"
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"MICHIGAN" Combination Steel and Wood Pipe

LONG DISTANCE CONVEYOR OF WATER AND PAPER STOCK IN PAPER AND PULP MILLS—Specially Adapted to Carry Sulphite, Ground Wood and "White Water"

Eighteen reasons why you should use "Michigan" combination steel and wood pipe

1—Durability of Wood Shell. 2—Sanitary. 3—20% more capacity than Cast Iron Pipe. 4—Simplicity in handling. 5—Light in weight. 6—Speed in laying. 7—Protects against freezing. 8—Not affected by Electrolysis. 9—Rigid inspection of materials. 10—Efficient construction of stave. 11—Strength of steel banding. 12—Protection of banding with asphalt coating. 13—Cannot burst under pressure. 14—Can be laid in a wet trench. 15—Short curves without specials. 16—Low installation and maintenance cost. 17—Responsibility of company. 18—Not affected by sulphur or chemical solutions.

THE MICHIGAN PIPE COMPANY

Dept. 17 **BAY CITY, MICHIGAN**

New York City, N. Y.....17 East 42nd St.
Oklahoma City, Okla.....105 West 16th St.
Chicago, Ill.....Leiter Bldg., 15 East Van Buren St.
Boston, Mass.....Room 737, Oliver Bldg.
Cleveland, Ohio.....919 Ulmer Bldg.
Chattanooga, Tenn.....702 James Bldg.
Philadelphia, Pa.....318 Widener Bldg.
Pittsburgh, Pa.....323 Fulton Bldg.

"Steel for Strength—Wood for Durability"

clined somewhat sharply since demand from consuming quarters subsided. There is, however, a feeling of confidence in pulp circles. It is acknowledged that the immediate condition of the market is easy, that little important demand is emanating from paper mills, and that unusually large quantities of pulp are arriving from Europe at American ports, yet it is believed all these bearish factors will be offset once consumers resume buying in something approaching normal volume in the new year as it is expected consumption of pulp over the next few months will be fully up to available supplies.

Bleached sulphite is in slow demand but domestic producers continue to quote 4.75 to 5 cents a pound at pulp mills, the latter figure being asked for strictly No. 1 quality sulphite. Unbleached sulphite is quoted at around 2.75 cents a pound and up to 3 cents for the No. 1 grade, with news print quality quoted at about 2.60 cents at producing plants. Kraft pulp is a little lower in price at between 2.80 and 3 cents a pound.

F.o.b. pulp mill quotations follow:

Bleached sulphite	4.75-5.00
Easy bleaching sulphite	3.00-3.25
Unbleached sulphite, No. 1	2.75-3.00
News grade sulphite	2.60-2.75
Soda pulp, bleached	4.00-4.25
Mitscherlich, unbleached	3.25-3.50
Kraft, No. 1	2.80-3.00
Screenings, refined	1.00-1.15

Mechanical Pulp

There has been some slowing down of demand for mechanical wood pulp yet the market presents a fairly active complexion and prices are well maintained. Probably the strongest single factor in ground wood is that stocks are at a low level. The heavy consumption during the past three or four months, and the less than normal production, due to curtailed operations of grinding plants owing to water conditions, have greatly reduced mill stocks of pulp, and sellers have continued to exhibit a firm attitude even though they have encountered less demand from consumers. Another sustaining factor is that a good many manufacturers, having but limited stocks on hand, are conserving their ground wood, frequently refusing to sell any surplus which they might produce in the fear they themselves might have need for it later on. This reduces offerings in the open market and makes for steadiness in quotations.

Prices on domestic ground wood of prime spruce variety, freshly ground, generally range around $40 a ton f.o.b. grinding plants. Reports have been received of some sales at a little under this level but the bulk of current business is going through at about this figure, while importers are quoting approximately the same price for foreign ground wood ex dock at American seaports. The outlook for ground wood is bullish, to say the least. If consumption keeps up at the rate reached in the past few months during the first part of 1923 it seems more than likely that higher prices will be scored. Moreover, if this winter is a severe one, thereby curtailing grinding operations in the different parts of the country and in Canada, it is not unlikely that a shortage of mechanical pulp may arise.

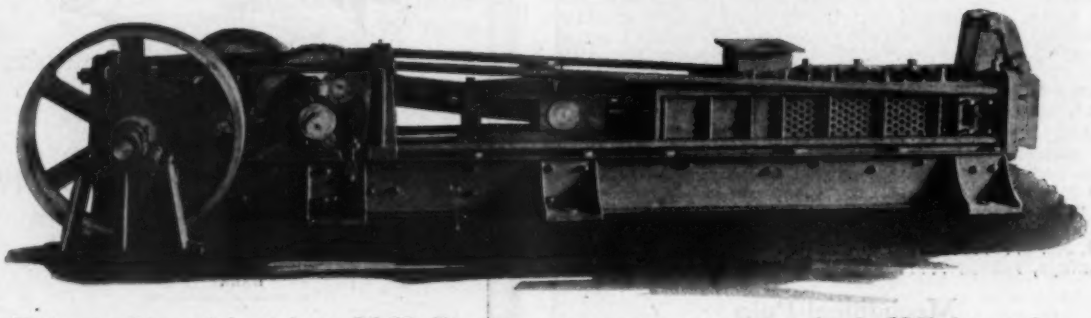
Chemicals

Trade activity in papermaking chemicals is largely a routine affair at the moment, there being little new demand from consuming quarters though with a good and steady movement of supplies against contracts. Casein is in a strong position and high prices are quoted on this article, it being said that producers and importers are asking as high as 25 cents a pound in some cases for forward shipments. Bleaching powder is firm at about 2 cents a pound for spot delivery, and caustic soda is bringing 2.50 cents per pound on contract and about a quarter of a cent higher for spot shipment. China clay quotations are steady. Brimstone is still quoted at $18 to $20 per long ton at mines.

Average quotations are as follows:

Alum, lump ammonia	3.25- 3.50
Alum, lump starch	3.75- 4.00
Blanc fixe, powdered	3.50- 3.75
Bleaching powder	1.75- 2.00
Brimstone (long ton, at mine)	18.00-20.00
Casein	18.00- ...
Caustic soda, spot delivery	2.50- 2.75
China clay, domestic washed	12.00-15.00
China clay, foreign	15.00-22.00
Rosin, grade E	7.00- ...
Satin white	1.50- 1.75
Soda ash, 58 per cent light (bags)	1.25- 1.35
Starch, papermakers', in bags	2.70- 2.80
Talc (ton)	14.00-17.00

THE GIANT NEKOOSA BARK PRESS



This machine, driven by a 25 H. P. motor, presses wet spruce bark 52% bone dry, and wet hemlock bark 49% bone dry. This refuse is thereby turned into a good, usable fuel.

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White sulphite No. 1	11-20
Colored rag	15-40
Ledger—	
White rag	18-50
White sulphite	13-25
Colored sulphite	11-20
Colored rag	13-50
Bonds—	
White rag	18-40
White sulphite	9-20
Colored sulphite	10-25
Colored rag	17-40
Book—	
No. 1 S. & S. C	7.00- 7.50
Machine finished	6.75- 7.25
English finished	6.75- 7.25
Coated and enameled	10.25-12.00
Lithograph, M. F	10.00-12.00
News Print—	
Rolls, contract	3.75-4.00
Rolls, transient	4.00-4.25
Sheets	4.25-4.50
Side runs	3.25-3.50
Cover stock—	
Coated, both sides	9.25-
Coated, one side	9.20-
Tissue—	
No. 1 white, 20x30	.85- .95
No. 2 white, 24x36	.75- .80
No. 1 manila, 24x36	.75- .80
Kraft	1.00-1.25
Wrappings—	
No. 1 Kraft	7.00-7.50
No. 2 Kraft	6.25-6.50
Boards—	
	New York and Chicago
Solid news	60.00-65.00
Straw	52.50-57.50
Plain chip	52.50-55.00
White coated chip	70.00-75.00
Manila coated chip	65.00-70.00
Binders' board	85.00-90.00

Pulp Manufacturers Reorganize

On January 1, 1923, an organization known as the U. S. Pulp Producers Association began operation. This association is a development from, and takes the place of, the old Pulp Manufacturers' Association. It was organized to meet the needs of the changing conditions in the paper industry, where many of the larger paper mills are now operating pulp mills as a part of their own plants.

This new association proposes to continue the statistical work of the Pulp Manufacturers' Association, and to expand its reports to cover not only domestic, but also foreign, production, shipments, exports, etc. An interesting phase of its work will be periodic reports on the pulpwood situation of the United States, prepared in cooperation with the Woodlands Section of the American Paper and Pulp Association.

This announcement of the organization of the news association of pulp producers comes only after most careful consideration by the pulp manufacturers of the United States. The present membership of the news association will result in weekly and monthly reports based on a very large percentage of the total pulp production of the United States. A feature of its work in connection with these reports will be the preparation of charts showing graphically the production, orders, shipments and imports of the several grades of pulp.

The purposes of the United States Pulp Producers' Association, as outlined by its Secretary, O. M. Porter, who is also assistant secretary of the American Paper and Pulp Association and secretary of its Woodlands Section, are as follows:

a.—To distribute to members regularly and promptly all the available statistical data regarding the production and importation of the various grades of wood pulp, and, so far as is possible, pulpwood.

b.—To provide a means for concerted action by pulp manufacturers in matters of tariff, taxation, legislation, etc.

c.—To further the uniformity of cost finding methods in the pulp industry.

d.—To increase the effectiveness and economy of pulp production.

The officers of the new organization are:

President—T. W. Ross, Hummel-Ross Fibre Corporation.

Vice Presidents—L. M. Alexander, Nekoosa-Edwards Paper Co.; D. C. Everest, Marathon Paper Mills Co.; E. W. Kiefer, Port Huron Sulphite & Paper Co.; W. H. Savery, Harpers Ferry Paper Co.

Executive Committee—Herman Elsas, Continental Paper and Bag Mills; George W. Sisson, Jr., Racquette River Paper Co.; W. H. Sullivan, Bogalusa Paper Co., Inc.

Secretary-Treasurer—O. M. Porter.

Baker Summarizes Work of Association

Twelve accomplishments of the year were cited by Dr. Hugh P. Baker, Executive Secretary of the American Paper and Pulp Association, when he addressed a conference of members of the Association and invited guests from the Springfield district at the Nayasset Club on Tuesday, December 12. The conference was held to determine how the Association could be of special assistance to the manufacturers of fine paper in this district, probably the greatest fine paper producing region of the world.

"Through the central organization it has been possible to achieve some important results during the last year," said Dr. Baker, "results which could not have been accomplished by the manufacturers working individually. The twelve which are probably of greatest importance to the entire industry are the following:

1—Made presentation for the paper industry of tariff brief, which won very favorable comment from the Senate Finance Committee.

2—Through strong committee from the industry influenced the establishment of a Paper Division in the Department of Commerce.

3—Inaugurated a campaign for the more extensive collection of waste paper, to meet the shortage of this raw material of the industry, an important activity in view of the fact that the 1922 consumption of waste paper, to a total of over 1,900,000 tons costing the paper manufacturers $50,000,000.

4—Assisted the coated paper manufacturers in their efforts to secure free entry of casein, a vital and essential raw material, of which there is now a serious shortage.

5—Established Information Service as clearing house for statistical and informational material for use within and without the industry.

6—Developed Woodlands Section for pulpwood statistics and direct service to those responsible for the woods operations of the paper industry.

7—Aided in preventing passage by Congress of hastily drawn bills on stream pollution which would have closed many paper mills, and joined Secretary Hoover in asking investigation to determine proper legislation.

8—United important industrial and social organizations in campaign for national forestry legislation.

9—Stimulated governmental and mill studies of wood and pulp decay prevention.

10—Established cooperation through a standing committee of the Association with the U. S. Bureau of Standards.

11—Accomplished closer coordination of the Technical, Cost, Salesmen's and Superintendents' Associations, extending their service to all members of the Association.

12—Conventions in New York and Chicago, coordinating more closely than ever before all elements of the industry."

The Brazilian senate has under consideration a bill granting a loan to the first company to establish a factory for the manufacture of paper from domestic raw material. The loan is not to exceed 50% of the total value of the plant computed on a basis of about $78 for each ton of annual capacity.

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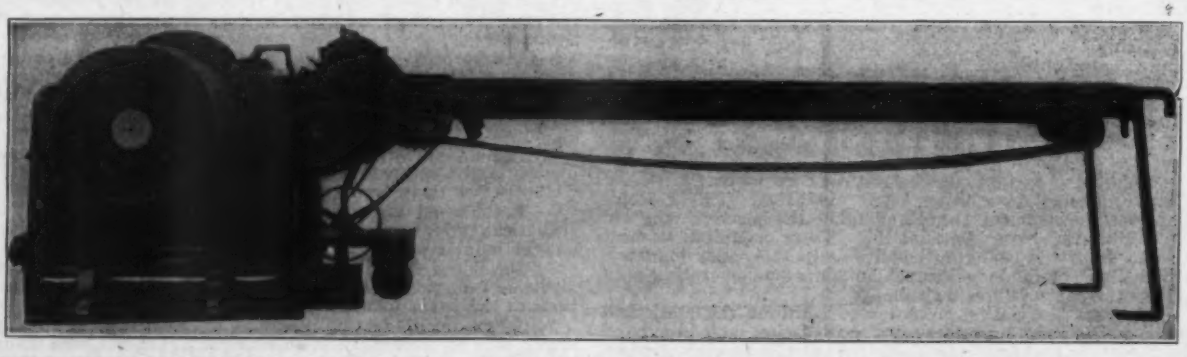

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Wood Pulp

The closing days of 1922 have witnessed a slowing down of demand from paper mills for foreign wood pulp. As is invariably the case at this period of the year, consumers have been more intent on keeping their stocks low than in augmenting their holdings, and recent business consequently has chiefly revolved around purchases of small tonnage against immediate requirements. There has been a steady movement of pulp against back orders and contracts, despite which, however, the trend of prices has been toward lower levels, arrivals of both sulphite and kraft pulp from foreign sources having been so large as to make for a more or less topheavy market condition, temporarily at least.

A review of pulp import statistics thus far available for 1922 shows that a total of 640,335 net tons of chemical wood pulp was imported into the United States during the first nine months of last year. This doubtless constitutes a record of pulp importations. Prior to the war the trade was accustomed to figure that around 35,000 tons a month was an average of pulp imports, but in January to September, inclusive, of 1922, monthly importations averaged 71,148 net tons, which average probably has never before been equaled over the same length of time.

The probabilities are that the monthly average of pulp imports over the entire of 1922 will be even larger than the foregoing figure as arrivals during the last several months of the year were exceptionally heavy. Swedish manufacturers have been rushing out as much pulp as possible before the closing of the Baltic for the winter, and the bulk of this supply has come to the United States. While most of the pulp recently landed is said to have been sold on contract, it has been but natural for consumers in this country to hold back from buying, especially since it has been the time of the year they generally curtail their purchasing. The consequence has been that importers, in at least some cases, anxious to dispose of spot accumulations, have reduced prices slightly, and the tone of quotations at present is not near so firm as it was a short while ago.

Bleached sulphite of No. 1 grade is quoted at around 4.50 cents per pound on the dock at New York or other American Atlantic ports, with quotations ranging a quarter of a cent a pound on either side of this figure. Unbleached sulphite is quoted down to 2.75 cents ex dock and up to 3 cents, depending on the quality and the tonnage involved, while easy bleaching sulphite holds at 3 to 3.25 cents per pound. Kraft pulp of Scandinavian origin has eased off to about 2.75 cents or a trifle less.

Receipts at the port of New York in December and current market quotations ex dock New York follow:

Bleached sulphite, No. 1	$ 4.25-$ 4.75
Unbleached sulphite, No. 1	2.75- 3.00
Easy bleaching	3.00- 3.25
Mitscherlich unbleached	3.00- 3.25
Kraft	2.70- 2.90
Ground wood, per ton	40.00- 42.00

H. Hollesen, 4,070 bls. from Bremen and 1,550 bls. from Hamburg; Castle, Gottheil & Overton, 330 bls. from Hamburg and 792 bls. from Rotterdam; Nilsen, Lyon & Co., 1,200 bls. from Trondhjem; Johaneson, Wales & Sparre, 18,588 bls. from Harnosand, 1,375 bls. from Skutskar, 1,875 bls. from Gefle and 127 bls. from Copenhagen; E. Naumberg & Co., 1,800 bls. from Trondhjem and 600 bls. from Christiania; J. Andersen & Co., 2,550 bls. from Graeker; American Woodpulp Corp., 5,025 bls. from Hamburg and 6,000 bls. from Harnosand; Bulkley, Duton & Co., 4,250 bls. from Bremen, 1,500 bls. from Iggesund and 750 bls. from Gefle; Scandinavian-American Trading Co., 2,496 bls. from Bremen, 400 bls. from Skutskar and 2,125 bls. from Gefle; Borregaard Co., 200 bls. from Christiania; M. Gottesman & Co., 3,000 bls. from Christiania; E. M. Sergeant & Co., 775 bls. from Christiania; A. J. Pagel & Co., 17,500 bls. from Gefle; E. J. Keller Co., 1,000 bls. from Essvik; Whalen Pulp and Paper Mills, 6,400 bls. from Vancouver; Mechanics & Metals National Bank, 1,800 bls. from Sundsvall and 750 bls. from Christiania; National City Bank, 3,600 bls. from Sundsvall and 3,750 bls. from Graeker; American Exchange National Bank, 600 bls. from Christiania; Kidder, Peabody & Co., 800 bls. from Christiania; French-American Banking Corp., 500 bls. from Christiania; Irving National Bank, 987 bls. from Helsingfors and 811 bls. from Kotka; Guaranty Trust Co., 500 bls. from Copenhagen; Order, 1,200 bls. from Hamburg, 3,600 bls. from Sundsvall, 575 bls. from Christiania, 2,125 bls. from Skutskar and 6,290 bls. from Vancouver.

Paper Stock

Importations of cotton rags and other papermaking materials fell off considerably during December, reflecting the slow demand from consumers during November and the early part of last month. There were fair quantities of rags received but indications were that most of the supply arriving in December was against old orders, importers asserting that the prices prevailing in the market here allowed them but little profit in buying in Europe and bringing material into the United States. Old rope imports held up close to normal, whereas receipts of old bagging were unusually light.

Arrivals at the port of New York in December follow:

Old Rope

Brown Bros. & Co., 566 coils and 32 bls. from Hull, 457 coils from Bristol, 84 bls. from Rotterdam, 225 coils and 149 bls. from Antwerp and 49 bls. from Glasgow; W. H. Cummings & Sons, 56 bls. from Havre; New York Trust Co., 129 bls. from Bremen; E. J. Keller Co., 176 bls. from Havre, 87 coils from Leith and 145 coils from Algiers; Bank of New York, 201 bls. from Barcelona; H. F. Reed, 131 coils from Hamburg; Irving National Bank, 46 coils from Hamburg; Ellerman Wilson S. S. Line, 122 coils from Southampton and 78 coils from London; Chemical National Bank, 79 bls. from Bremen; Merritt & Chapman Co., 27 bals. from Kingston; Wilkinson Bros. & Co., 90 coils from Leith, 162 bls. from Antwerp and 180 coils from Hull; W. Schall & Co., 59 bls. from Barcelona; M. Wolfer & Co., 12 bls. from Havana; Salomon Bros. & Co., 225 bls. from Marseilles; Maurice O'Meara Co., 49 coils from Antwerp; Ladenburg, Thalman & Co., 86 bls. from Bordeaux; White Star Line, 42 bls. from Hamburg; Cuban-American Metal Co., 18 bls. from Havana; International Purchasing Co., 76 bls. from Havre; Katbenstein & Keene, 94 bls. from Genoa; Order, 119 coils from Rotterdam, 30 bls. from Barcelona and 166 bls. from Hamburg.

Old Bagging

American Exchange National Bank, 95 bls. from Antwerp; Katbenstein & Keene, 5 bls. from Manchester; Mechanics & Metals National Bank, 47 bls. from Manchester; Waste Material Trading Corp., 208 bls. from Rotterdam; E. J. Keller Co., 110 bls. from London, 106 bls. from Hamburg and 138 bls. from Antwerp; G. M. Graves Co., 83 bls. from London; E. Butterworth & Co., 92 bls. from Antwerp; R. F. Downing & Co., 81 bls. from Antwerp; Order, 198 bls. from Havre, 79 bls. from Barcelona and 2 bls. from Liverpool.

Rags

S. Silberman Co., 97 bls. from Manchester, 329 bls. from Rotterdam and 236 bls. from Antwerp; Stone Bros. & Galaup Co., 244 bls. from Havre and 57 bls. from Antwerp; P. Berlowitz, 52 bls. from Havre and 50 bls. from Antwerp; M. Moran, 41 bls. from Liverpool; Maurice O'Meara Co., 113 bls. from Hamburg and 33 bls. from Antwerp; W. Hughes & Co., 323 bls. from Rotterdam and 362 bls. from Antwerp; Katzenstein & Keene, 432 bls. from Rotterdam, 96 bls. from Barcelona, 8 bls. from London and 268 bls. from Marseilles; E. J. Keller Co., 140 bls. from Rotterdam, 410 bls. from Antwerp, 184 bls. from Algiers, 193 bls. from Marseilles, 56 bls. from Havre, 266 bls. from Bordeaux and 141 bls. from Hamburg; Lavin & Rosenberg, 430 bls. from London and 835 bls. from Bristol; Wilkinson Bros. & Co., 77 bls. from Antwerp; American Woodpulp Corp., 155 bls. from Rotterdam, 2,179 bls. from Antwerp and 206 bls. from Marseilles; F. P. Gaskell & Co., 315 bls. from Bremen; M. Wolfer & Co., 13 bls. from Havana; Castle, Gottheil & Overton, 412 bls. from Bordeaux and 39 bls. from Havre; Daniel M. Hicks, Inc., 139 bls. from Havre and 70 bls. from Marseilles; American Express Co., 21 bls. from Liverpool and 47 bls. from Havre; Ladenburg, Thalman & Co., 101 bls. from Hamburg and 47

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bls. from Antwerp; Judson Freight Forwarding Co., 57 bls. from Havre; W. Schall & Co., 645 bls. from Havre and 99 bls. from Rotterdam; W. Van Doorn, 480 bls. from Rotterdam; Brown Bros. & Co., 77 bls. from Antwerp; American Exchange National Bank, 166 bls. from Antwerp and 406 bls. from Hamburg; State Bank, 29 bls. from Havre, 564 bls. from Hamburg and 26 bls. from Rotterdam; Irving National Bank, 38 bls. from Manchester, 89 bls. from Hamburg, 56 bls. from Bremen and 704 bls. from Marseilles; Guaranty Trust Co., 23 bls. from Manchester; International Acceptance Bank, 188 bls. from Manchester; Mechanics & Metals National Bank, 54 bls. from Havre; Atlas Waste Mfg. Co., 69 bls. from Havre; Ignazio, Adela & Co., 390 bls. from Trieste; Bankers Trust Co., 10 bls. from Hamburg; National City Bank, 179 bls. from Marseilles; Order, 163 bls. from Havre, 1,615 bls. from Hamburg, 308 bls. from Constantinople, 362 bls. from Liverpool, 30 bls. from Manchester, 290 bls. from London and 462 bls. from Bordeaux.

Miscellaneous Paper Stock

E. J. Keller Co., 329 bls. from Hamburg and 481 bls. from Antwerp; Equitable Trust Co., 66 bls. from Antwerp, 29 bls. from Manchester, 75 bls. from Hull, 81 bls. from Leith, 42 bls. from Bristol, 72 bls. from Glasgow and 197 bls. from London; Mechanics & Metals National Bank, 57 bls. from Antwerp and 184 bls. from Algiers; Lavin & Rosenberg, 134 bls. from Glasgow; Brown Bros. & Co., 131 bls. from Glasgow; Cleveland-Akron Bag Co., 400 bls. from Manila; Irving National Bank, 98 bls. from Leith, 538 bls. from Antwerp and 86 bls. from Copenhagen; Battery Park National Bank, 348 bls. from Bristol; International Acceptance Bank, 30 bls. from Glasgow; Salomon Bros. & Co., 211 bls. from Antwerp; Schulz & Ruckgaber, 66 bls. from Liverpool; American Express Co., 62 bls. from Glasgow; Order, 145 bls. from Glasgow, 500 bls. from Bristol, 142 bls. from London, 39 bls. from Dundee, 68 bls. from Dublin, 138 bls. from Belfast and 100 bls. from Antwerp.

Paper

Arrivals of news print and wrapping paper from Germany and the Scandinavian countries were fairly heavy in December and continued to be the feature of the import trade of the United States in paper. Usual amounts of filter, hanging, cigarette and drawing paper were received during the month. Imports of paper of all kinds through the port of New York in December follow:

Cigarette

American Tobacco Co., 1,120 cs. from Bordeaux; Rose & Frank Co., 203 cs. from Havre and 51 cs. from Southampton; P. J. Schweitzer, 31 cs. from Marseilles; De Manduit Paper Corp., 119 cs. from Marseilles and 319 cs. from Havre; Hard & Ritter, 40 cs. from Barcelona; British-American Tobacco Co., 170 cs. from Liverpool; Niebrugge & Day, 2 cs. from Barcelona; G. A. Vedovi & Co., 3 cs. from Genoa; Kaufman Bros. & Bondy, 8 cs. from Bordeaux; Order, 35 cs. from Barcelona.

Printing

Maurice O'Meara Co., 138 rolls from Gothenburg and 102 cs. from Antwerp; Bankers Trust Co., 207 rolls from Hamburg, 219 rolls from Gothenburg and 192 rolls from Christiania; Parsons & Whittemore, 6,476 rolls from Bremen and 106 rolls from Hamburg; New York Tribune, 418 rolls from Bremen; New York Times, 236 rolls from Christiania; New York American, 1,557 rolls from Hallstavik; Virginia Paper Co., 153 rolls from Bremen; J. B. Harris Paper Co., 114 rolls from Bremen; W. W. Bowater & Sons, 54 rolls from Rotterdam; B. F. Drakenfeld & Co., 19 cs. from Liverpool; H. Lips, 442 cs. from Antwerp; P. C. Zuhlke, 144 bls. from Antwerp; Street & Smith Publishing Co., 1,006 rolls from Bremen; Diem & Wing Paper Co., 44 rolls from Bremen; Globe Shipping Co., 250 cs. from Bremen; Chemical National Bank, 455 rolls from Hamburg; Republic Bag & Paper Co., 163 rolls from London and 540 rolls from Hamburg; Ladenburg, Thalman & Co., 146 bls. from Hamburg; Equitable Trust Co., 35 rolls from Hamburg; C. L. Robinson, 440 rolls from Hamburg; Philadelphia National Bank, 18 cs. from Hamburg; Deel Publishing Co., 144 rolls from Hamburg; C. H. Young Publishing Co., 470 rolls from Hamburg; Irving National Bank, 111 rolls from Hamburg; C. Steiner, 51 cs. from Bremen; Perkins-Goodwin Co., 16 bls. from Rotterdam; P. Puttmann, 17 cs. from Antwerp; French-American Banking Corp., 367 rolls from Gefle; Oxford University Press, 20 cs. from Liverpool; New Haven Times-Leader, 200 rolls from Christiania; W. F. Etherington & Co., 73 cs. from Glasgow; J. Munroe & Co.,

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1,571 rolls from Hamburg; Order, 10 rolls from Gothenburg, 584 rolls from Hallstavik, 386 rolls from Christiania, 1,275 rolls from Hamburg, 1,190 rolls from Bremen and 212 rolls from London.

Wrapping

Arkell Safety Bag Co., 285 rolls from Gothenburg and 321 rolls from Copenhagen; Chemical National Bank, 1,671 rolls and 18 bls. from Gothenburg; C. K. MacAlpine, 233 rolls and 5 bls. from Gothenburg; Great Atlantic & Pacific Tea Co., 354 bls. from Gothenburg; C. G. Winans & Co., 624 rolls and 3 bls. from Gothenburg; Maurice O'Meara Co., 1,087 rolls and 288 bls. from Gothenburg; Coy, Disbrow & Co., 45 bls. from Gothenburg; Bank of America, 386 bls. from Gothenburg and 59 bls. and 94 rolls from Copenhagen; Mugler & Umlauf, 309 rolls and 61 bls. from Gothenburg; Wilkinson Bros. & Co., 115 bls. from Gothenburg, 455 bls. and 866 rolls from Rotterdam and 34 bls. from Copenhagen; Thomas Barrett & Son, 49 bls. from Gothenburg and 135 bls. and 64 rolls from Hamburg; A. E. MacAdam & Co., 3,301 rolls and 127 bls. from Gothenburb; Bankers Trust Co., 657 bls. from Gothenburg; J. W. Devoy, 19 bls. from Gothenburg; Republic Bag & Paper Co., 484 rolls from Trieste, 1,299 rolls from Hamburg and 1,801 rolls from Christiania; C. Steiner, 45 bls. from Bremen; Blauvelt-Wiley Paper Mfg. Co., 60 bls. from Glasgow and 20 bls. and 55 rolls from Hamburg; Ladenburg, Thalman & Co., 943 bls. and 1,175 rolls from Hamburg; M. Winter, 4,842 rolls and 37 bls. from Hamburg; D. S. Walton & Co., 220 rolls from Hamburg; International Acceptance Bank, 965 bls. from Trondhjem and 1,185 rolls and 245 bls. from Christiania; Irving National Bank, 165 rolls from Hamburg and 39 bls. and 164 rolls from Copenhagen; L. Schulman Co., 610 bls. from Bremen; H. Reeve Angel & Co., 89 bls. from Bremen; M. M. Cohen, 239 bls. from Hamburg; Baxter Paper Co., 74 bls. from Hamburg; Equitable Trust Co., 198 bls. and 233 rolls from Copenhagen and 370 bls. from Hamburg; J. P. Heffer-man Paper Co., 16 bls. from Copenhagen; Chatham & Phenix National Bank, 158 rolls from Copenhagen; Order, 87 rolls from Gothenburg, 336 bls. and 552 rolls from Hamburg, 26 bls. from Trondhjem, 80 bls. from Antwerp, 52 bls. from Bremen, 46 bls. from Copenhagen and 112 bls. from Christiania.

Hanging

National City Bank, 640 bls. from Bremen and 54 rolls from Antwerp; Birn & Wachenheim, 19 cs. from Havre; A. Murphy & Co., 51 cs. from Liverpool and 12 bls. from Southampton; W. H. S. Lloyd & Co., 94 bls. from London and 12 bls. from Liverpool; A. C. Dodman, 59 bls. from Liverpool and 26 bls. from Southampton; R. F. Downing & Co., 4 cs. from London and 35 cs. from Yokohama; F. G. Prager & Co., 3,137 rolls and 664 bls. from Antwerp; Erstein & Co., 5 cs. from Havre; Order, 3 bls. from Antwerp.

Writing

Louis De Jonge Co., 134 cs. from Marseilles; American Express Co., 30 cs. from Trieste; N. A. Gottlieb, 2 cs. from Havre; E. Dietzgen & Co., 29 cs. from Marseilles; F. Ferris & Co., 12 bls. from Bremen; Order, 10 cs. from Antwerp.

Drawing

Keuffel & Esser Co., 35 cs. from Rotterdam, 6 cs. from Liverpool and 47 cs. from Hamburg; R. F. Downing & Co., 2 cs. from Southampton and 2 cs. from London; H. Reeve Angel & Co., 4 cs. from Yokohama; Lunham & Moore, 22 cs. from London and 3 cs. from Southampton; E. Dietzgen & Co., 91 cs. from Hamburg; Order, 5 cs. from Hamburg.

Filter

E. Fougera & Co., 143 cs. from Southampton; Bernard, Judae & Co., 2 cs. from Gothenburg; Lunham & Moore, 9 cs. from Southampton and 14 cs. from London; Zinkeisen & Co., 10 bls. from Bordeaux; A. Giese & Son, 5 bls. from Hamburg; J. Manheimer, 21 cs. from Havre.

Tissue

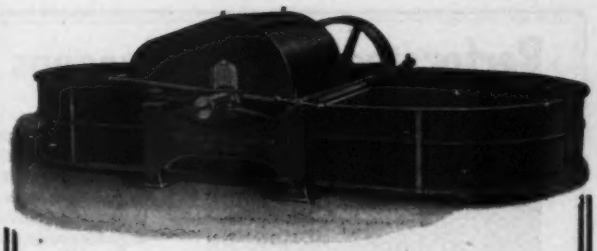
F. C. Strype, 32 cs. from Liverpool; American Merchants Shipping and Forwarding Co., 27 cs. from Hamburg; C. H. Wyman Shipping Co., 4 cs. from Liverpool; R. F. Downing & Co., 6 bls. from London; Meadows, Wye & Co., 8 cs. from Liverpool.

Photo

Gevaert Co. of America, 55 cs. from Antwerp; J. J. Gavin & Co., 3 cs. from Liverpool.

Boards

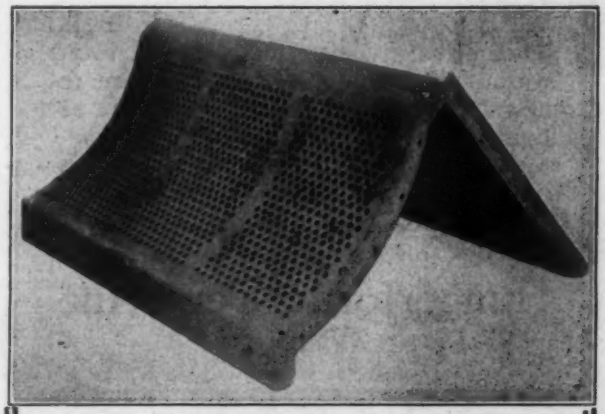
Bendix Paper Co., 79 cs. from Hamburg; Leunis & Co., 11 cs. from Hamburg; Bank of the United States, 242 rolls from



"Dayton" Beating Engines are Built for Heavy Duty

Dayton Beater and Hoist Co.

DAYTON, OHIO

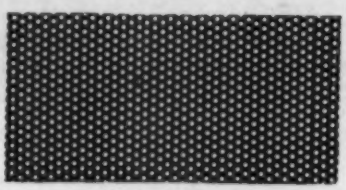


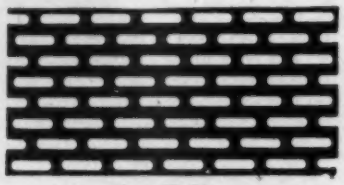
Because there are no moving parts this is a very simple but very efficient device. Patent No. 1,271,426 issued to Mr. Brownell Buehler, July 2nd, 1918.

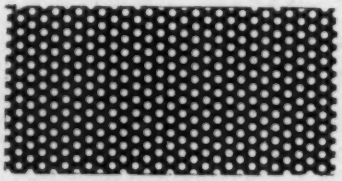
The Shartle Continuous Beater Company

MIDDLETOWN, OHIO

Perforated Metal Screens for Pulp and Paper Mills


.065 inch round


⅛ x ½" Slots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A SPECIAL filter for paper mills, producing all the results the paper manufacturer desires. It is a modification of the well known Hungerford filter adapted to paper mill use. It is constructed of concrete, strictly wrought iron pipe, brass strainers and especially prepared silica sand. It is as durable and efficient as can be built at any cost. It can be sold at a very low figure.

This filter gives perfectly clear water, washes thoroughly, does not require renewal of the sand bed, is absolutely reliable in the performance of its duty and requires a minimum amount of attention.

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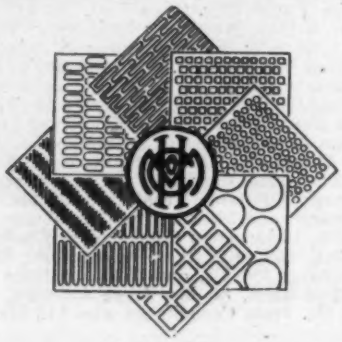

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The Pipe of Service

DURABLE—ECONOMICAL—EASY TO INSTALL

Built of selected Canadian White Pine. Wyckoff Wood Pipe is wound with steel bands whose tensile strength is 50,000 to 65,000 lbs. per square inch. The experienced engineer selects a pipe of proven dependability. Wyckoff Wood Pipe, during the past 65 years, has built a reputation that stands the keenest competition. It has been, during this time, the choice of the largest pipe users in the world. We also manufacture a high grade underground steam pipe casing.

Write today for catalog and prices

A. Wyckoff & Son Company
1855 Elmira, N. Y., U. S. A. 1922

Rotterdam; Buschmann Bros., 300 rolls from Rotterdam; Wiebush Calender Importing Co., 18 cs. from Hamburg; A. Bourjois & Co., 24 cs. from Havre; F. J. Scanlan, 310 cs. from Havre; Manufacturers Trust Co., 8 cs. from Hamburg; Irving National Bank, 3,649 rolls from Hamburg.

Miscellaneous

Japan Paper Co., 54 cs. from Genoa and 65 cs. from Havre; Quality Art Novelty Co., 52 cs. from Hamburg; Pacific Bank, 33 cs. from Yokohama; Charles W. Williams & Co., 11 cs. from Antwerp; F. L. Kraemer & Co., 13 cs. from London and 2 cs. from Hamburg; A. Frankan & Co., 5 cs. from Hamburg; Whiting-Patterson Co., 24 cs. from Havre; Independent Forwarding Co., 13 cs. from Havre; Birn & Wachenheim, 250 bls. from Bremen and 14 cs. from Havre; Paper Novelty Mfg. Co., 44 cs. from Bremen; American Shipping Co., 20 cs. from Hamburg; O. G. Hempstead & Sons, 4 cs. from Hamburg; Canson & Montgolfer, 42 cs. from Havre; O. W. Fenton, Inc., 13 bls. from Hamburg; Coenca-Morrison Co., 2 cs. from Havre; Huth, Gillespie & Co., 7 cs. from Hamburg.

Foreign Correspondence

Dresden, January 1, 1923.

German Press Handicapped

The latter part of July, 1922, the Imperial parliament passed the "Law Governing the Measures for Assisting the Suffering Press." This law is an economic protective measure, yet political considerations are largely responsible for it. For the government to carry out the resolution of the Reichstag was no easy task. The minister for economics called it one of the most serious laws ever passed. The empire was utterly unable to make really helpful financial sacrifices to the press, and could do no more than allow a cheap tariff on the state railways and mail for transmiting newspapers. Therefore the task was finding out new resources. It is being done by a tax on the sales for wood sold within the country and by an export tax for paper products. By this law the government has the right to fix maximum prices for cellulose, pulp and printing paper; further, to provide compulsory combination of the producers of these goods for equalizing the prices, under the supervision of authorities within such combinations.

It is true that the government and parliament had good intentions. But on the other hand the experiment was doomed to failure owing to the unfortunate development of German economics. It was a trial with unsuitable measures. The law maintains that the press now, as formerly, must be assisted to obtain cheaper paper. It planned to secure thus 500 million marks a year from the above two sources. With this sum the price for paper can be cheapened 2 to 4 marks per kilogram of paper if we estimate the yearly paper consumption for newspapers, 20-24,000 railway vans. When the law was put in force the price for such paper was 20 marks per kilogram, but it has risen remarkably since then, viz.: 28 marks on August 1st, 70 marks on September 1st, 83 marks on October 1st, 162 marks on November 1st, 174 marks on November 15th, and to crown these monster prices, 300 marks in December.

Let us briefly look at the development of prices during the past year, 1922. The figures in brackets mean the increase in percentage on one railway van of paper for the press. Cost before the war was 2,100 marks, in January 1922, 70,225 marks (already an increase of 3,344%); in April 128225 marks, (6,106%); in July 200,225 marks (9,534%); in October 830,225 marks (39,534%); in November 1,620,225 marks (77,153%); in December 3,000,000 marks (142,857%). Thus the intended cheapening of the paper was made illusory only after a few weeks by the phantastic price increase.

Despite the fall of the mark the export has not greatly revived and promises few profits since the inland prices come very near those of the world market. The tax at the timber sales is mostly shifted, by the owner of the forest, onto the buyer and thus on the shoulders of the paper consumer, etc., chiefly the press. These facts show that by such a measure there is no cheapening of printing paper. A shrinkage therefore goes on in the field of newspapers and periodicals such as has never been experienced since the war and of course never before it. About every month the postoffice publishes a list of papers which have gone out of existence and among them are such which were founded 50 and 75 years ago. Other daily or trade papers get into fusion with others or they appear less frequently. Daily papers are published 3, 2 or even one time a week. Weeklies are issued monthly and the like.

Concerning the wood, a catastrophe is approaching unless Germany can obtain timber from abroad at reasonable prices and much hope is placed on Russia and the border states, which have a low currency. Those papers which coura-

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Not Where Is and As Is

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FOURDRINIER PARTS—Pusey & Jones 112", 100" equipped with new Century Shake. 96" Kutter Trowbridge.
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DRYERS—Four 48"x111". One 36"x80". Two 30"x84". Two 36"x74". Four 48"x72". Four 48"x68". One 84"x67". Eleven 42"x66". Eight 36"x62". Two 36"x48". Four 20"x39".
CHILLED CALENDERS—One 86" six roll. One 82" five roll. One 66" five roll. One 58" five roll. One 54" five roll.
SLITTERS AND WINDERS—One 120" Warren. One 108" Kidder. One 110" two drum Moore & White winder. One 82" Langston. One 46" Langston. One 40" Kidder.
BEATERS—Three N. & W. 72"x42". One Holyoke 54"x60" equipped with four Tyler washers. One Dilts 62"x50" iron tub. One Jones 62"x52". One Dillon 60x48". Two Emerson 54"x60". Three Dowington 54"x42" iron tub. One Jones 42"x38". Seven Horne 36"x36". One N. & W. 36"x26". Two No. 2 Claflins. Two No. 1 Claflins.
JORDANS—One Appleton Wagg Majestic. Two No. 2 Dillon improved. One Large Horne. Two Monarch. One Jones Standard. One Pope brushing.
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STUFF PUMPS—Deans triplex 9"x8". Goulds triplex 8"x12". Goulds triplex 6"x12". Beloit duplex 6"x14". Twelve 5" post.
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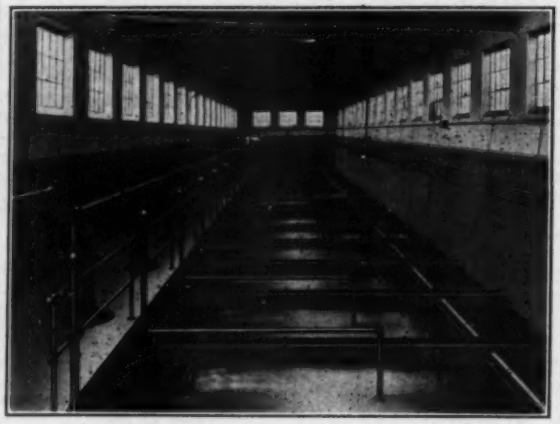

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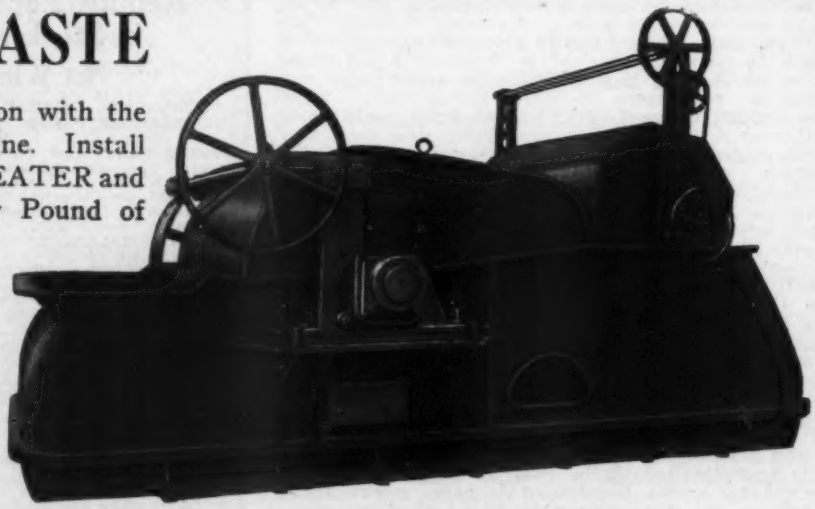

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geously face the situation are obliged to increase the rates for subscriptions and advertisements quite considerable and the consequence is that they lose subscribers and advertisers. It is rare now that a family of the middle classes subscribes to even one daily paper.

Vessels of Pulp and Hard Paper

While in former years the material for vessels was wood, metal or clay, attempts have been made during the past few years to use hard paper, hard cardboard and pulp for the same purpose. Pulp is obtained by pressing wood against rotating stones, while water is being added.

Vessels are made in masses with the help of special machinery, paper machines, hydraulic press pumps, winding machines and iron molds. Either the pressing process is employed or the pulp is wound round a corresponding cord and impregnated with suitable materials. Of course the vessels can be made of cardboard too and the joints fastened like it is done with boxes, or they can be pasted over. On the other hand a seamless cylinder open on both sides, fitted with longitudinal folds is placed into a cylindrical or conical mold with domed bottom, and is driven by a stamp of calotte shape into an equally hollowed out matrix (die). The lower cylinder end is put into a domed, tapering mold. At last these vessels are transferred into a second die with flat bottom into which a stamp with even front it driven. Thus the vaulted bottom of the vessel, pressed into a plone, is smoothed, after which the central opening is fully closed. The manufacturing process may seem simple to outsiders, but experiments had to be made for several years to find out a really reliable process fulfilling both technical and economical requirements.

The manufacture is carried on by the leading industrial countries. In one of them only bottles of woodpulp saturated with paraffin are employed for milk transportation. If machines are used three workmen are able to turn out 5,000 bottles per hour. The substance needed is a thick wood-paste of which one ton suffices for 600,000 bottles. Into the raw paste a steel core is dipped which after being taken out is turned three times around its axis, pressed together with a pair of tongs. Bottom and cover are made and pressed on by another machine. Although it is quite possible to manufacture, also, non-cylindrical vessels, it is not done very much. Cylindrical ones can be made quicker and require less expensive arrangements.

Impregnating is done with asphalt, sulphur, resinous substances, paraffin, barrel-lacquers, etc. Finally the whole is coated by an odorless, tasteless mixture, cellon, cellite or cellulose-slime.

The vessels thus produced are excellently adapted for packing any kind of food. The bottles are mostly thrown away after being used once and serve for shipping beer, mineral water and practically any drinkable liquid. What has been done with jars, bottles, can also be done with dishes, molds, tins, boxes, tubs, etc. The advantages of such paper vessels are the absence of seams and folds, low weight, absolute tightness, almost unlimited wear and they are not affected by heat or cold. Shrinkage by drying and oxidizing is also impossible.

Recent Capital Increases

The Gould Paper Company, of Lyons Falls, N. Y., has increased its capital from $2,000,000 to $10,000,000.

The Island Paper Company, of Carthage, N. Y., has filed notice of an increase in capital stock from $60,000 to $600,000.

The North End Paper Company, of Fulton, N. Y., has increased its capital from $40,000 to $150,000.

The Pulp and Paper Trading Company, of New York City, pulp and paper importers and dealers, has increased its capital from $500,000 to $600,000.

Darmstadt, Scott & Courtney, packers of paper mill supplies of New York City, have doubled their capital stock from $100,000 to $200,000.

The A. G. Nelson Paper Company, of New York City, paper dealers and mill agents, has increased its capital from $10,000 to $30,000.

The Union Card and Paper Company, of New York City, paper jobbers, has increased its capital from $150,000 to $500,000.

The Seneca Paper Company, of Geneva, N. Y., has filed notice of an increase in capital from $10,000 to $50,000.

The James P. Hefferman Paper Company, of New York City, paper importers and dealers, has increased its capital stock from $50,000 to $100,000.

The Hudson Valley Paper Company, of Albany, N. Y., has filed notice of an increase in capital from $125,000 to $500,000.

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Paper Makers Chemical Company

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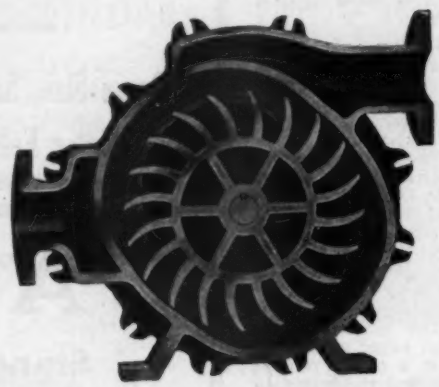

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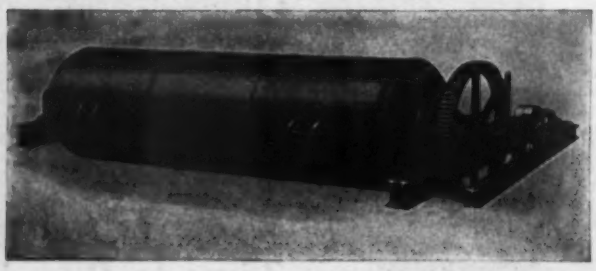

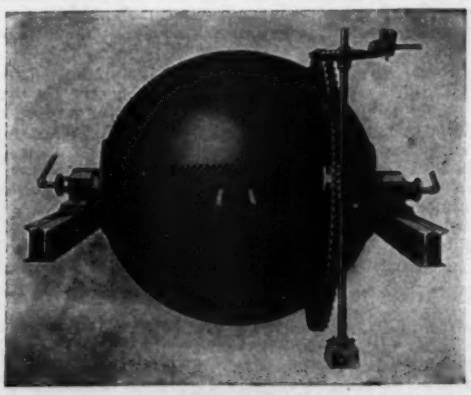

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The Biggs Boiler Works Co. Akron Ohio

"Biggs Rotaries" cover the whole range of paper mill output. Profit by Biggs' long experience studying and solving paper plant engineering problems. Full particulars gladly mailed at your request.

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Buyers' Guide—What and Where to Buy

Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

ADHESIVES
E. F. Russ Co., Boston.
ACID RESISTING BRONZE
Eastwood Wire Mfg. Co., Belleville, N. J.
William A. Hardy & Sons, Fitchburg, Mass.
ACID RESISTING PAINT
Detroit Graphite Co., Detroit, Mich.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
AGITATOR EQUIPMENT
Moore & White Co., Philadelphia.
AIR COMPRESSORS
Hooven, Owens, Rentschler Co., Hamilton, O.
AIR CONDITIONING AND CONTROL APPARATUS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., Milwaukee, Wis.
Clarage Fan Co., Kalamazoo, Mich.
J. O. Ross Eng. Corp., New York City.
B. F. Sturtevant Co., Hyde Park, Boston.
ALKALI
Diamond Alkali Co., Pittsburgh.
Solvay Process Co., Syracuse, N. Y.
ANGLE VALVES
The Crane Company, Chicago.
Eastwood Wire Mfg. Co., Belleville, N. J.
ARCHITECTS
James L. Carey, Chicago.
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ASSORTING TABLES
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BAKELITE GEARS
D. O. James Mfg. Co., Chicago.
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The Draper Mfg. Co., Port Huron, Mich.
BALLS (Brass)
The Draper Mfg. Co., Port Huron, Mich.
BALLS (Iron and Steel)
The Draper Mfg. Co., Port Huron, Mich.
BANDLESS ROLLS
Valley Iron Works Co., Appleton, Wis.
BARKERS
Holyoke Machine Co., Holyoke, Mass.
Union Iron Works, Bangor, Me.
Valley Iron Works Co., Appleton, Wis.
BEARINGS
The Falls Clutch & M. Co., Cuyahoga Falls, O.
T. B. Wood's Sons Co., Chambersburg, Pa.
BEARINGS (Ball)
S. K. F. Industries, New York City.
BEATER BARS (Bronze)
American Manganese Bronze Co., Philadelphia.
BEATER ROLL FILING
Taylor Wharton Iron & Steel Co., Highbridge, N. J.
BEATING, WASHING AND BLEACHING ENGINES
Dayton Beater & Hoist Co., Dayton, O.
Holyoke Machine Co., Holyoke, Mass.
Noble & Wood Machine Co., Hoosick Falls, N. Y.
Valley Iron Works Co., Appleton, Wis.
BEATERS (Continuous)
Claflin Engineering Co., Lancaster, O.
BELT DRIVES
The Falls Clutch & M. Co., Cuyahoga Falls, O.
The Link Belt Co., Chicago.
Morse Chain Co., Ithaca, N. Y.
T. B. Wood's Sons Co., Chambersburg, Pa.
BELTING (Rubber)
B. F. Goodrich Rubber Co., Akron, O.
The Republic Rubber Co., Youngstown, Ohio.
Voorhees Rubber Belt Co., Jersey City, N. J.
BELTING (Silent Chain)
Link Belt Co., Chicago.
Morse Chain Co., Ithaca, N. Y.
BELT LACING
Flexible Steel Lacing Co., Chicago.
BLEACHING BOILERS
The Biggs Boiler Works Co., Akron, O.
BLEACHING POWDER
Pennsylvania Salt Mfg. Co., Philadelphia.
BLEACHING (Propellers)
Moore and White Co., Philadelphia.
BLEEDER TURBINE
Moore Steam Turbine Corp., Wellsville, N. Y.
BLOWERS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Moore Steam Turbine Corp., Wellsville, N. Y.
J. O. Ross Eng. Corp., New York City.
B. F. Sturtevant Co., Hyde Park, Boston.
BLOW-OFF VALVES
Henry Horkman, Neenah, Wis.
BOARD MACHINES
Beloit Iron Works, Beloit, Wis.
Black-Clawson Co., Hamilton, O.
Valley Iron Works, Appleton, Wis.
BOILERS
J. F. Davis, Chicago.
BOILERS (Electric)
Electric Furnace Con. Co., Philadelphia.
BRASS WIRE CLOTH
Appleton Wire Works, Appleton, Wis.
Cheney Bigelow Wire Works, Springfield, Mass.
Eastwood Wire Mfg. Co., Belleville, N. J.
Lindsay Wire Weaving Co., Cleveland, O.
W. S. Tyler Co., Cleveland, O.
BRICK AND CONCRETE PAINT
Detroit Graphite Co., Detroit, Mich.
BRIMSTONE
Union Sulphur Co., New York City.
BRONZE CASTINGS
Eastwood Wire Mfg. Co., Belleville, N. J.
BUCKETS (Elevator)
Hendricks Mfg. Co., Carbondale, Pa.
Robins Conveying Belt Co., New York City.
CALENDERS
Beloit Iron Works, Beloit, Wis.
Holyoke Machine Co., Holyoke, Mass.
Norwood Eng. Co., Florence, Mass.
Smith & Winchester Mfg. Co., So. Windham, Conn.
CALENDER DOCTORS
Ticonderoga Machine Works, Ticonderoga, N. Y.
CALENDER ROLLS
Holyoke Machine Co., Holyoke, Mass.
CASEIN
Casein Mfg. Co., New York City.
CASTINGS (Iron & Brass)
Smith & Winchester Mfg. Co., So. Windham, Conn.
CASTINGS (Brass and Bronze)
Eastwood Wire Mfg. Co., Belleville, N. J.
CASTINGS (Grey Iron)
Nordberg Mfg. Co., Milwaukee, Wis.
Robins Conveying Belt Co., New York City.
CAST IRON PIPE
American Cast Iron Pipe Co., Birmingham, Ala.
CAUSTIC SODA
Diamond Alkali Co., Pittsburgh.
Edw. Hill's Son & Co., New York City.
Solvay Process Co., Syracuse, N. Y.
CEMENT
Smith & Winchester Mfg. Co., So. Windham, Conn.
CEMENT PAINT
Detroit Graphite Co., Detroit, Mich.
CENTRIFUGAL PUMPS
American Steam Pump Co., Battle Creek, Mich.
Buffalo Steam Pump Co., Buffalo, N. Y.
E. M. Cross Mach. Co., Berlin, N. H.
Glens Falls Machine Works, Glens Falls, N. Y.
Ingersoll-Rand Co., New York City.
Valley Iron Works Co., Appleton, Wis.
CHAINS
The Union Chain & Mfg. Co., Sandusky, O.
CHAIN DRIVES
Link Belt Co., Chicago.
Morse Chain Co., Ithaca, N. Y.
CHAIN GRATES
Green Eng. Co., East Chicago, Ind.
CHEMICALS
Diamond Alkali Co., Pittsburgh.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Hercules Powder Co., New York City.
Merrimac Chemical Co., Boston.
Wing & Evans, Inc., New York City.
CHEMICAL STONEWARE
Maurice A. Knight, East Akron, O.
CHIMNEYS (Metal)
Littleford Bros., Cincinnati, O.
CHIPPERS
Holyoke Machine Co., Holyoke, Mass.
Union Iron Works, Bangor, Me.
Valley Iron Works Co., Appleton, Wis.
CLAYS AND FILLERS
Daniel M. Hicks, New York City.
CHLORINE (Liquid)
Mathieson Alkali Wks., Inc., New York City.
COAL BUNKERS
The Brownhoist Co., Cleveland, O.
COAL CRUSHERS
Orton & Steinbrenner Co., Chicago.
COAL & ASH HANDLING SYSTEMS
The Brown Hoisting Mach. Co., Cleveland, O.
Godfrey Conveyor Co., Elkhart, Ind.
Link Belt Co., Chicago.
COATED PAPERS
Watervliet Paper Co., Watervliet, Mich.
CONCRETE FLOOR HARDENER
Detroit Graphite Co., Detroit, Mich.
CONCRETE PAINT
Detroit Graphite Co., Detroit, Mich.
CONDENSERS
Nordberg Mfg. Co., Milwaukee, Wis.
CONSULTING ENGINEERS
James L. Carey, Chicago.
Hardy S. Ferguson, New York City.
Ferguson Engineers, Chicago.
George F. Hardy, New York City.
V. D. Simons, Chicago.
Jos. H. Wallace & Co., New York City.
CONSULTING ENGINEERS (Power)
H. M. Barter, Cleveland.
Ferguson Engineers, Chicago.
V. D. Simons, Chicago.
CONTRACTORS (Building)
The Austin Co., Cleveland, O.
CONVEYORS
The Brown Hoisting Mach. Co., Cleveland, O.
Godfrey Conveyor Co., Elkhart, Ind.
Link Belt Co., Chicago.
Union Chain & Mfg. Co., Sandusky, O.
CONVEYORS (Belt)
Robins Conveying Belt Co., New York City.
CORDUROY WIRE CLOTH
The W. S. Tyler Co., Cleveland, O.
CORES (Collapsible)
Smith & Winchester Mfg. Co., So. Windham, Conn.
CORLISS ENGINES
Nordberg Mfg. Co., Milwaukee, Wis.
COUPLINGS
The Falls Clutch & M. Co., Cuyahoga Falls, O.
COUPLINGS (Shaft)
T. B. Wood's Sons Co., Chambersburg, Pa.
CRANES (Auto)
The Byers Mach. Co., Ravenna, O.
CRANES (Crawling Traster)
The Brown Hoisting Mach. Co., Cleveland, O.
Industrial Works, Bay City, Mich.
CRANES (Dipper Arm)
Industrial Works, Bay City, Mich.
Orton & Steinbrenner Co., Chicago.
CRANES (Locomotive)
Brownhoist Co., Cleveland, O.
Link Belt Co., Chicago.
Industrial Works, Bay City, Mich.
Orton & Steinbrenner Co., Chicago.
CRANES (Overhead)
Northern Engineering Works, Detroit, Mich.
CREOSOTING CYLINDERS
Biggs Boiler Works Co., Akron, O.
CRUSHERS (Coal and Coke)
Robins Conveying Belt Co., New York City.
CUTTERS
Smith & Winchester Mfg. Co., So. Windham, Conn.
CYLINDER MACHINES
Smith & Winchester Mfg. Co., So. Windham, Conn.
CYLINDER MOLDS (New or Repaired)
Appleton Wire Works, Appleton, Wis.
Beloit Iron Works, Beloit, Wis.
Cheney Bigelow Wire Works, Springfield, Mass.
Eastwood Wire Mfg. Co., Belleville, N. J.
Glens Falls Machine Works, Glens Falls, N. Y.
The Lindsay Wire Weaving Co., Cleveland, O.
The W. S. Tyler Co., Cleveland, O.
Wisconsin Wire Works, Appleton, Wis.
DANDY ROLLS
Appleton Wire Works, Appleton, Wis.
Central Mfg. Co., Kalamazoo, Mich.
Cheney Bigelow Wire Works, Springfield, Mass.
Eastwood Wire Mfg. Co., Belleville, N. J.
Lindsay Wire Weaving Co., Cleveland, O.
The W. S. Tyler Co., Cleveland, O.
DIE PRESSES
Smith & Winchester Mfg. Co., So. Windham, Conn.
DIESEL ENGINES
Nordberg Mfg. Co., Milwaukee, Wis.
DIGESTERS
The Biggs Boiler Works Co., Akron, O.
Chicago Bridge & Iron Wks., Chicago.
Manitowoc Eng. Works, Manitowoc, Wis.
DIGESTER COVERS
Eastwood Wire Mfg. Co., Belleville, N. J.
DRAFT GAUGES
The Foxboro Co., Foxboro, Mass.
DRUM WINDERS (Drives)
Beloit Iron Works, Beloit, Wis.
Ticonderoga Machine Co., Ticonderoga, N. Y.
DRYERS
Smith & Winchester Mfg. Co., So. Windham, Conn.
DRYERS (Rotary)
Biggs Boiler Works Co., Akron, O.
DRYER EXHAUST
Nash Engineering Co., So. Norwalk, Conn.
DRYER FELTS
Appleton Woolen Co., Appleton, Wis.
Fitchburg Duck Mills, Fitchburg, Mass.
F. C. Huyck & Sons, Albany, N. Y.
Lockport Felt Co., Lockport, N. Y.
Shuler and Benninghofen, Hamilton, O.
DRYING MACHINES
Drying Machine Corp. of Am., Inc., New York City.
DRYING SYSTEMS
J. O. Ross Eng. Corp., New York City.
DYESTUFFS
E. I. Du Pont de Nemours & Co., Wilmington, Del.
H. A. Metz & Co., Inc., New York City.
National Aniline & Chem. Co., New York City.
Standard Ultramarine Co., Huntington, W. Va.
Sandoz Chemical Works, New York City.
The White Tar Aniline Corp., New York City.
DUST COLLECTING SYSTEMS
Bayley Mfg. Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
ELECTRIC HOISTS
Link-Belt Co., Chicago.
Northern Engineering Co., Detroit, Mich.
ELECTRIC STEAM GENERATORS AND BOILERS
Electric Furnace Construction Co., Philadelphia.
ELECTRICAL MACHINERY
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
ELEVATORS
The Brown Hoisting Mach. Co., Cleveland, O.
Link Belt Co., Chicago.
ELEVATORS (Portable)
New Jersey Fdy. & Mach. Co., New York City.

"TOLEDOS"

will solve piping problems in your plant

An equipment of "Toledos" will handle any piping job that might arise in your plant and do it with the least labor, in the shortest time and with the smallest amount invested in the equipment.

"Toledos" are made for cutting or threading any size of pipe up to 12", and any one of the tools may be operated in any place the pipe may happen to be, and so easily one man can operate them without difficulty. These same portable hand tools can be connected to a "Toledo" Power Drive as shown in the illustration and converted instantly into the most efficient power machines.

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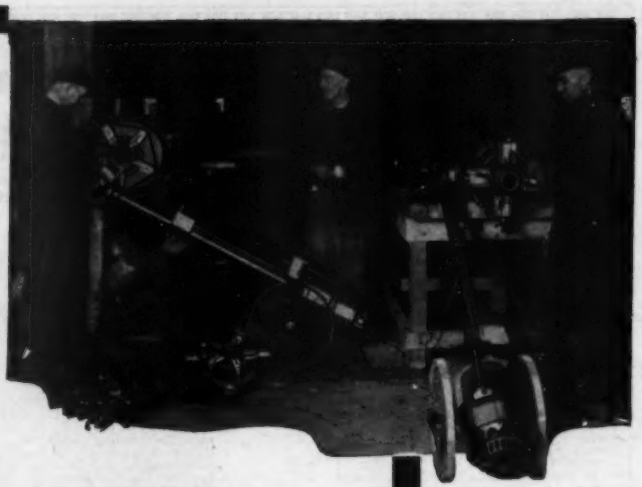
A copy of our complete catalog will be sent on request.



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Toledo, Ohio — New York Office, 50 Church St.

We Guarantee

the size, the weight, the material and the workmanship of Appleton Felts and Jackets.

For thirty-two years this guarantee has stood back of our products and our service to the paper manufacturing industry.

Let us show you how Appleton service will be advantageous to you. Write for prices and complete facts.

APPLETON WOOLEN MILLS

Appleton, Wisconsin

Appleton

Felts and Jackets

Buyers' Guide—What and Where to Buy

Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

ENGINES
American Blower Co., Detroit, Mich.
Hooven, Owens, Rentschler Co., Hamilton, O.

ENGINES (Pumping)
Hooven, Owens, Rentschler Co., Hamilton, O.

ENGINES (Repairs)
Hooven, Owens, Rentschler Co., Hamilton, O.

ENGINES (Steam)
Hooven, Owens, Rentschler Co., Hamilton, O.

ENGINEERS
B. M. Baxter, Cleveland, O.
James L. Carey, Chicago.
George F. Hardy, New York City.
Hardy S. Ferguson, New York City.
Ferguson Engineers, Chicago.
Management Eng. & Dev. Co., Dayton, O.
V. D. Simons, Chicago.
Stebbins Engineering & Mfg. Co., Watertown, N. Y.
Jos. H. Wallace & Co., New York City.

ENGINEERS (Structural)
The Austin Co., Cleveland, O.

ENGINEERS (Valuation)
Ford, Bacon & Davis, Inc., New York City.

EVAPORATORS
Swenson Evaporator Co., Chicago.

EXHAUSTERS
American Blower Co., Detroit, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
J. O. Ross Eng. Corp., New York City.

FANS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
J. O. Ross Eng. Corp., New York City.
B. F. Sturtevant Co., Hyde Park, Boston.

FELTS AND JACKETS
Appleton Woolen Co., Appleton, Wis.
Pitchburg Duck Mills, Fitchburg, Mass.
F. C. Huyck & Sons, Albany, N. Y.
Lockport Felt Co., Newfane, N. Y.
Shuler and Benninghofen, Hamilton, O.
Waterbury Felt Co., Skaneateles Falls, N. Y.

FELT AND WIRE GUIDES
Moore & White Co., Philadelphia.

FILTER (Continuous Suction)
Oliver Continuous Filter Co., Los Angeles, Calif.

FILTERS (Pressure and Gravity)
Hungerford & Terry, Inc., Clayton, N. J.
Norwood Eng. Co., Florence, Mass.
The Permutit Co., New York City.

FLAT WALL PAINT
Detroit Graphite Co., Detroit, Mich.

FLOUR SACK MACHINERY
Smith & Winchester Mfg. Co., So. Windham, Conn.

FLOW METERS
Republic Flow Meters Co., Chicago.

FLUID METERS
Bailey Meter Co., Cleveland, O.

FLY BARS
Noble and Wood Mach. Co., Hoosick Falls, N. Y.

FOURDRINIER MACHINES
Smith & Winchester Mfg. Co., So. Windham, Conn.

FOURDRINIER WIRES
Appleton Wire Works, Appleton, Wis.
Chesney Bigelow Wire Works, Springfield, Mass.
Eastwood Wire Mfg. Co., Belleville, N. J.
Lindsay Wire Weaving Co., Cleveland, O.
The W. S. Tyler Co., Cleveland, O.
Wisconsin Wire Works, Appleton, Wis.

FRICTION CLUTCHES
The Falls Clutch & M. Co., Cuyahoga Falls, O.
Moore and White Co., Philadelphia
A. Plamondon Mfg. Co., Chicago.
T. B. Wood's Sons Co., Chambersburg, Pa.

GEARS
Cleveland Worm Gear Co., Cleveland, O.
The Falls Clutch & M. Co., Cuyahoga Falls, O.
Foote Bros. Gear & Machine Co., Chicago.
D. O. James Mfg. Co., Chicago.
Meisel Press Mfg. Co., Boston.
A. Plamondon Mfg. Co., Chicago
Robins Conveying Belt Co., New York City.

GEARS (Bakelite)
Foote Bros. Gear & Mach. Co., Chicago.

GEARS (Heavy Duty)
Foote Bros. Gear & Mach. Co., Chicago.
D. O. James Mfg. Co., Chicago.

GEARS (Rawhide)
Foote Bros. Gear & Mach. Co., Chicago.
D. O. James Mfg. Co., Chicago.

GEARS, REDUCTION
Moore Steam Turbine Corp., Wellsville, N. Y.

GEARS (Silent Chain)
Morse Chain Co., Ithaca, N. Y.

GEARS (Worm)
Cleveland Worm & Gear Co., Cleveland, O.

GENERATING SETS
Moore Steam Turbine Corp., Wellsville, N. Y.

GENERATORS (Turbo)
Moore Steam Turbine Corp., Wellsville, N. Y.

GLUES
E. F. Russ Co., Boston.

GRAB BUCKETS
The Brown Hoisting Mach. Co., Cleveland, O.
The Byers Mach. Co., Ravenna, O.
Industrial Works, Bay City, Mich.
Orton & Steinbrenner Co., Chicago

GRANITE ROLLS
Jones Bros. Co., Barre, Vt.

GREASE CUPS
The Falls Clutch & M. Co., Cuyahoga Falls, O.
Hunter Pressed Steel Co., Lansdale, Pa.

GRINDERS
Glens Falls Machine Works, Glens Falls, N. Y.
Holyoke Machine Co., Holyoke, Mass.
Nekoosa Motor & Mach. Co., Nekoosa, Wis.
Union Iron Works, Bangor, Me.
Valley Iron Works, Appleton, Wis.

HAMMERS (Double Acting Steam Pile)
Industrial Works, Bay City, Mich.

HANGERS
The Falls Clutch & M. Co., Cuyahoga Falls, O.
T. B. Wood's Sons Co., Chambersburg, Pa.

HEAT RESISTING PAINTS
Detroit Graphite Co., Detroit, Mich.
The Franklin Paint Co., Cleveland, O.

HEATERS (Open Steam)
Biggs Boiler Works Co., Akron, O.

HEATING SYSTEMS
American Blower Co., Detroit, Mich.
Buffalo Forge Co., Buffalo, N. Y.
J. O. Ross Engineering Corp., New York City.
Skinner Bros. Co., St. Louis, Mo.

HOISTS (Electric)
Northern Eng. Works, Detroit, Mich.

HOISTING AND CONVEYING SYSTEMS
The Brown Hoisting Mach. Co., Cleveland, O.
Link-Belt Co., Chicago.
Northern Engineering Co., Detroit, Mich.

HOSE
Voorhees Rubber Co., Jersey City, N. J.

HOISTING AND MONORAIL SYSTEMS
The Brown Hoisting Machine Co., Cleveland, O
Northern Eng. Works, Detroit, Mich.

HOUSE PAINT
Detroit Graphite Co., Detroit, Mich.

HYDRAULIC TURBINES
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Holyoke Machine Co., Holyoke, Mass.

IRON CASTINGS
Beloit Iron Works, Beloit, Wis.
Valley Iron Works Co., Appleton, Wis.

IRON FILLER
Detroit Graphite Co., Detroit, Mich.

IRON & STEEL SUPPLIES
Brown-Wales Co., Boston.

JORDAN ENGINES
Jones & Sons Co., E. D., Pittsfield, Mass.
Noble and Wood Mach. Co., Hoosick Falls, N. Y.
Smith & Winchester Mfg. Co., So. Windham, Conn.
Shartle Bros. Machine Co., Middletown, O.

JORDAN FILLINGS
Jones & Sons Co., E. D., Pittsfield, Mass.
Noble and Wood Mach. Co., Hoosick Falls, N. Y.
The Shartle Bros. Mach. Co., Middletown, O.
Taylor Wharton Iron & Steel Co., Highbridge, N. J.

JORDAN FILLINGS (Grease)
American Manganese Bronze Co., Philadelphia.

KETTLES (Steam Jacketed)
The Biggs Boiler Works Co., Akron, O.
Littleford Bros., Cincinnati, O.

KNIVES
Simonds Mfg. Co., Fitchburg, Mass.

KRAFT AND SULPHATE PULPS
The Borregaard Co., Inc., New York City.

LABORATORY MACHINERY
Noble and Wood Mach. Co., Hoosick Falls, N. Y.

LAYBOYS
Moore and White Co., Philadelphia.

LIGHT REFLECTING PAINT
Detroit Graphite Co., Detroit, Mich.

LIQUID CHLORINE
Mathieson Alkali Works, Inc., New York City.

LUBRICATING GRAPHITE
Detroit Graphite Co., Detroit, Mich.

LURRICATING GREASE
The Keystone Lubricating Co., Philadelphia.
Robins Conveying Belt Co., New York City.

MACHINE DRYER TEMP. CONTROL
Open Coil Heater and Purifier Co., Indianapolis, Ind.

MACHINE PAINTS
Detroit Graphite Co., Detroit, Mich.

MECHANICAL DRAFT APPARATUS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
B. F. Sturtevant Co., Hyde Park, Boston.

MECHANICAL PULP
J. Anderson & Co., New York City.
The Borregaard Co., Inc., New York City.

MECHANICAL RUBBER GOODS
Voorhees Rubber Co., Jersey City, N. J.

METAL PROTECTING PAINTS
Detroit Graphite Co., Detroit, Mich.

MILL ARCHITECTS
Stebbins Engineering & Mfg. Co., Watertown, N. Y.

MILL WHITE
Detroit Graphite Co., Detroit, Mich.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
St. Louis Surfacer & Paint Co., St. Louis, Mo.
U. S. Gutta Percha Co., Paintee, Providence, R. I.

NAVAL STORES
Hercules Powder Co., Wilmington, Del.

OIL CUPS
Hunter Pressed Steel Co., Lansdale, Pa.

OIL STORAGE SYSTEMS
Biggs Boiler Works Co., Akron, O.

PAINTS
Detroit Graphite Co., Detroit, Mich.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
St. Louis Surfacer & Paint Co., St. Louis, Mo.
U. S. Gutta Percha Paint Co., Providence, R. I.

PAPER BAG MACHINERY
Smith & Winchester Mfg. Co., So. Windham, Conn.

PAPER CUTTERS & SLITTERS
Beloit Iron Works, Beloit, Wis.
Hamblet Machine Co., Lawrence, Mass.
Meisel Press Mfg. Co., Boston, Mass.
Smith & Winchester Mfg. Co., South Windham, Conn.

PAPER EXPORTERS AND IMPORTERS
E. J. Keller Company, New York City.
Lagerloef Trading Co., New York City.

PAPER MACHINES
Bagley & Sewall Co., Watertown, N. Y.
Beloit Iron Works, Beloit, Wis.
The Black-Clawson Co., Hamilton, O.
Pusey & Jones Co., Wilmington, Del.
Smith & Winchester Mfg. Co., South Windham, Conn.
Valley Iron Works, Appleton, Wis.

PAPER MACHINE DRIVES
Harland Eng. Co., Montreal, Can.
Nordberg Mfg. Co., Milwaukee, Wis.
Westinghouse Elec. & Mach. Co., East Pittsburgh, Pa.

PAPER MANUFACTURERS
Eastern Manufacturing Co., New York City.
Hammermill Paper Co., Erie, Pa.
Marathon Paper Mills Co., Rothschild, Wis.
Munising Paper Co., Munising, Mich.
Nekoosa-Edwards Mfg. Co., Nekoosa, Wis.
Oxford Paper Co., New York City.
Watervliet Paper Co., Watervliet, Mich.
Wausau Sulphate Fibre Co., Mosinee, Wis.

PAPER MANUFACTURERS' SUPPLIES
J. Anderson & Co., New York City.
The Borregaard Co., Inc., New York City.
Diamond Alkali Co., Pittsburgh.
E. J. Keller Company, New York City.
Mendelson Bros. Paper Stock Co., Chicago.
Paper Trading Co., Boston.
Pennsylvania Salt Mfg. Co., Philadelphia.
Perkins-Goodwin Co., New York City.
H. B. Wadsworth, New York City.

PAPER STOCK CUTTERS
Taylor, Stiles & Co., Riegelsville, N. J.

PAPER TESTERS
Tinius Instrument Co., Philadelphia.

PARCHMENT MANUFACTURERS
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.

PENSTOCKS
The Biggs Boiler Works Co., Akron, O.
Chicago Bridge & Iron Wks., Chicago.
Riter-Conley Co., Pittsburgh.

PERFORATED METALS
Hendrick Mfg. Co., Carbondale, Pa.
Charles Mundt & Sons, Jersey City, N. J.

PERFORATORS
Meisel Press Mfg. Co., Boston.

PILLOW BLOCKS
T. W. Wood's Sons Co., Chambersburg, Pa.

PILE DRIVERS
Industrial Works, Bay City, Mich.

PINIONS
Foote Bros. Gear & Mach. Co., Chicago.

PIPE JOINT CEMENT
Detroit Graphite Co., Detroit, Mich.

PIPE RIVETED STEEL
The Biggs Boiler Works, Akron, O.

PIPING EQUIPMENT
Pittsburgh Piping & Equip. Co., Pittsburgh.

PIPING SYSTEMS INSTALLED
Pittsburgh Piping & Equip. Co., Pittsburgh.

PIPE THREADING & CUTTING MACHINERY
Toledo Pipe Threading Machine Co., Toledo, O.

PNEUMATIC CHIP HANDLING SYSTEMS
Bayley Mfg. Co., Milwaukee, Wis.

POWER TRANSMISSION
The Carlyle Johnson Machine Co., Manchester, Conn.
Dodge Mfg. Co., Mishawaka, Ind.
The Falls Clutch & M. Co., Cuyahoga Falls, O.
Link-Belt Co., Chicago.
D. O. James Mfg. Co., Chicago.
A. Plamondon Mfg. Co., Chicago.
Valley Iron Works, Williamsport, Pa.
T. B. Wood's Sons Co., Chambersburg, Pa.

PRESERVATIVE PAINTS
Detroit Graphite Co., Detroit, Mich.

PRINTING PRESSES
Meisel Press Mfg. Co., Boston.

PULLEYS
The Falls Clutch & M. Co., Cuyahoga Falls, O.
T. B. Wood's Sons Co., Chambersburg, Pa.

PULP (Chemical)
J. Anderson & Co., New York City.
The Borregaard Co., Inc., New York City.

The Sandy Hill Iron & Brass Works

Hudson Falls
New York

Manufacturers of **Paper and Pulp Mill Machinery**

Since 1836

Pulp Presses

DETAILS OF CONSTRUCTION

All steel construction except ram, which is chilled iron with ground working surface and outside packed.

Pressing table is 33″ wide by 46″ long.

Stroke of ram is 48″.

Equipped with Southwark two pressure three-way valves for Controlling.

Either single or two pressure systems available.

Provided with bottom pressing table and improved drop track which eliminates manual control.

Other Pulp and Paper Mill Equipment manufactured by Southwark

Sulphite Presses **Baling Presses**
Pumps and Accumulators

We carry in stock a complete line of
Hydraulic Valves **Fittings and Pipe**

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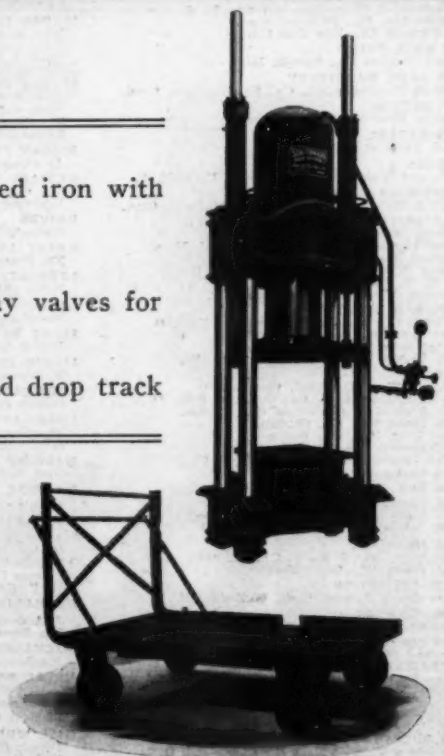
FOUNDRY AND MACHINE CO.
PHILADELPHIA, PA.



SOUTHWARK PULP CARRYING TRUCK

Buyers' Guide—What and Where to Buy

Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

E. J. Keller Company, New York City.
Lagerlof Trading Co., New York City.
Price & Pierce, Ltd., New York City.
The Pulp & Paper Trading Co., New York City.

PULP AND PAPER MILL MACHINERY
Beloit Iron Works, Beloit, Wis.
The Biggs Boiler Works Co., Akron, O.
The Black-Clawson Co., Hamilton, Ohio.
Carthage Mach. Co., Carthage, N. Y.
Davis, Frank H., Cambridge, Mass.
Dominion Engineering Works, Ltd., Montreal, Canada.
Glens Falls Machine Works, Glens Falls, N. Y.
Improved Paper Machinery Co., Nashua, N. H.
Moore & White Co., Philadelphia.
Nekoosa Motor & Mach. Co., Nekoosa, Wis.
Noble & Wood Machine Co., Hoosick Falls, N. Y.
Pusey & Jones Co., Wilmington, Del.
Sandusky Fdy. & Mach. Co., Sandusky, O.
The Sandy Hill Iron & Brass Works, Hudson Falls, N. Y.
Union Iron Works, Bangor, Me.
Valley Iron Works, Appleton, Wis.
Western Marine & Salvage Co., Alexandria, Va.

PULP GRINDERS
Glens Falls Machine Works, Glens Falls, N. Y.
Nekoosa Motor & Mach. Co., Nekoosa, Wis.
Union Iron Works, Bangor, Me.

PULP PRESSES
Southwork Foundry & Machine Co., Philadelphia.

PULP STONES
Smallwood-Low Stone Co., Lisbon, O.

PUMPS (Boiler Feed)
Moore Steam Turbine Corp., Wellsville, N. Y.

PUMPING MACHINERY
Hooven, Owens, Rentschler Co., Hamilton, O.

PUMPS (Stock)
Beloit Iron Works, Beloit, Wis.
Buffalo Steam Pump Co., Buffalo, N. Y.
Glens Falls Machine Works, Glens Falls, N. Y.
Gregg Pump Co., Kansas City, Mo.
Smith & Winchester Mfg. Co., So. Windham, Conn.

PUMPS (Centrifugal)
American Steam Pump Co., Battle Creek, Mich.
Aurora Pump & Mfg. Co., Aurora, Ill.
Buffalo Steam Pump Co., Buffalo, N. Y.
Cross, E. M., Mach. Co., Berlin, N. H.
DeLaval Steam Pump Co., Trenton, N. J.
Fairbanks, Morse & Co., Chicago.
Moore Steam Turbine Corp., Wellsville, N. Y.
Smith & Winchester Mfg. Co., So. Windham, Conn.

PUMPS (Deep Well)
Aurora Pump & Mfg. Co., Aurora, Ill.
A. D. Cook & Co., Inc., Lawrenceburg, Ind.
Gregg Pump Co., Kansas City, Mo.

PUMPS, TURBINE
Moore Steam Turbine Corp., Wellsville, N. Y.

PUMPS (Vacuum)
American Steam Pump Co., Battle Creek, Mich.
E. M. Cross Mach. Co., Berlin, N. H.
Nash Eng. Co., South Norwalk, Conn.

RAG AND PAPER DUSTERS
Holyoke Machine Co, Holyoke, Mass.
Norwood Eng. Co., Florence, Mass.

RECLAIMING MACHINERY
Swenson Evaporator Co., Chicago.

REDUCTION GEARS
Moore Steam Turbine Corp., Wellsville, N. Y.

REELS
Smith & Winchester Mfg. Co., So. Windham, Conn.

RELIEF GAS COOLER
Ryther & Pringle Co., Carthage, N. Y.

ROLLS (Rubber Covered)
B. F. Goodrich Co., Akron, Ohio.
Stowe & Woodward Co., Upper Newton Falls, Mass.

ROLLER BEARINGS
S. K. F. Industries, New York City.

ROOF DRYING SYSTEMS
Clarage Fan Co., Kalamazoo, Mich.
J. O. Ross Eng. Corp., New York City.

ROOF PAINT
Detroit Graphite Co., Detroit, Mich.

ROPE DRIVES
The Falls Clutch & M. Co., Cuyahoga Falls, O.
Dodge Mfg. Co., Mishawaka, Ind.
T. B. Wood's Sons Co., Chambersburg, Pa.

ROTARY BLEACHING BOILERS
The Biggs Boiler Works Co., Akron, O.

ROZIN
Hercules Powder Co., Wilmington, Del.

RUST RESISTING PAINT
Detroit Graphite Co., Detroit, Mich.

RUBBER GOODS
Voorhees Rubber Mfg. Co., Jersey City, N. J.

SAVE-ALLS
Glens Falls Machine Works, Glens Falls, N. Y.

SAWS
Simonds Mfg. Co., Fitchburg, Mass.

SCREENS
The Bagley & Sewall Co., Watertown, N. Y.
Union Iron Works, Bangor, Me.

SCREENS (Perforated Metal)
Hendrick Mfg. Co., Carbondale, Pa.
Charles Mundt & Sons, Jersey City, N. J.

SCREENS (Woven Wire)
The W. S. Tyler Co., Cleveland, O.

SCREEN PLATES
Central Mfg. Co., Kalamazoo, Mich.
William A. Hardy & Sons, Fitchburg, Mass.
Union Screen Plate Co., Fitchburg, Mass.

SHAFTING
The Falls Clutch & M. Co., Cuyahoga Falls, O.
T. B. Wood's Sons Co., Chambersburg, Pa.

SHOWER PIPES
Smith & Winchester Mfg. Co., So. Windham, Conn.

SHREDDERS
Mitts & Merrill, Saginaw, Mich.

SILENT CHAIN DRIVES
The Link Belt Co., Chicago.
Morse Chain Co., Ithaca, N. Y.

SIZE
Western Paper Makers' Chemical Co., Kalamazoo, Mich.

SLITTING AND REWINDING MACHINERY
Beloit Iron Works, Beloit, Wis.
Cameron Machine Co., Brooklyn, N. Y.
Hamblet Machine Co., Lawrence, Mass.
Meisel Press Mfg. Co., Boston.
Samuel M. Langston Co., Camden, N. J.

SOOT BLOWERS
Diamond Power Specialty Corporation, Detroit, Mich.

SODA ASH
Diamond Alkali Co., Pittsburgh.
Edw. Hill's Son & Co., New York City.
Solvay Process Co., Syracuse, N. Y.

SPECIAL MACHINERY
Nordberg Mfg. Co., Milwaukee, Wis.

SPEED CHANGES
Moore and White Co., Philadelphia.

SPEED REDUCERS
Foote Bros. Gear & Machine Co., Chicago.
D. O. James Mfg. Co., Chicago.
W. A. Jones Fdy. & Mach. Co., Chicago.

SPEED REDUCTION UNITS
Cleveland Worm & Gear Co., Cleveland, O.
Foote Bros. Gear & Machine Co., Chicago.
D. O. James Mfg. Co., Chicago
W. A. Jones Fdy. & Mach. Co., Chicago.

SPEED TRANSFORMERS
Foote Bros. Gear & Mach. Co., Chicago.
D. O. James Mfg. Co., Chicago.

SPIRAL GEARS
Foote Bros. Gear & Mach. Co., Chicago.
D. O. James Mfg. Co., Chicago.

SPRAY NOZZLES
Buffalo Forge Co., Buffalo, N. Y.

SPROCKETS
Morse Chain Co., Ithaca, N. Y.

STEAM GENERATORS (Electric)
Electric Furnace Con. Co., Philadelphia.

STEAM REGULATORS (For Dryers)
W. F. Pickles, Buckland, Conn.

STEAM TURBINES
Moore Steam Turbine Corp., Wellsville, N. Y.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
Terry Steam Turbine Co., Hartford, Conn.

STEEL PLATE CONSTRUCTION
The Biggs Boiler Works Co., Akron, O.
Hendrick Mfg. Co., Carbondale, Pa.
Riter-Conley Co., Pittsburgh.

STOCK CIRCULATING SYSTEM
Claflin Engineering Co., Lancaster, O.
Ticonderoga Machine Works, Ticonderoga, N. Y.

STOCK PUMPS
Beloit Iron Works, Beloit, Wis.
Buffalo Steam Pump Co., Buffalo, N. Y.

STORAGE TANKS (Steel)
The Biggs Boiler Works Co., Akron, O.
Riter-Conley Co., Pittsburgh.

STRAINERS
A. D. Cook, Inc., Lawrenceburg, Ind.

STRUCTURE STEEL PAINT
Detroit Graphite Co., Detroit, Mich.

STUFF CHESTS
Noble and Wood Mach. Co., Hoosick Falls, N. Y.

STUFF PUMPS
Noble and Wood Mach. Co., Hoosick Falls, N. Y.
De Laval Steam Pump Co., Trenton, N. J.

SUCTION ROLLS
Sandusky Foundry & Machine Co., Sandusky, O.

SULPHITE (Strong Bleached and Easy Bleaching)
The Borregaard Co., Inc., New York City.

SULPHITE FITTINGS
Eastwood Wire Mfg. Co., Belleville, N. J.

SULPHITE MACHINERY
The Biggs Boiler Works Co., Akron, O.

SULPHUR
Union Sulphur Co., New York City.

SULPHUR BURNERS
Glens Falls Machine Works, Glens Falls, N. Y.
Valley Iron Works Co., Appleton, Wis.

SUPERHEATERS
Power Specialty Co., New York City.

TANKS (Iron and Steel)
The Biggs Boiler Works Co., Akron, O.
Chicago Bridge & Iron Works, Chicago.
Littleford Bros., Cincinnati.

TANKS (Oil)
Biggs Boiler Works Co., Akron, O.
Chicago Bridge & Iron Wks., Chicago.

TANKS (Paint)
Biggs Boiler Works Co., Akron, O.

TANKS (Jacketed)
Biggs Boiler Works Co., Akron, O.

TANKS (Wooden)
Hauser-Stander Tank Co., Cincinnati.
Stevens Tank & Tower Co., Auburn, Me.

TANK PAINT
Detroit Graphite Co., Detroit, Mich.

TANKS AND TOWERS
Stevens Tank & Tower Co., Auburn, Me.

TOWERS (Loading and Unloading)
Robins Conveying Belt Co., New York City.

TRANSMISSION MACHINERY
Dodge Mfg. Co., Mishawaka, Ind.
Foote Bros. Gear & Mach. Co., Chicago.
T. B. Wood's Sons Co., Chambersburg, Pa.
D. O. James Mfg. Co, Chicago

TURBINE (Steam)
Moore Steam Turbine Corp., Wellsville, N. Y.
Terry Steam Turbine Co., Hartford, Conn.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

TURBINES (Hydraulic)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Holyoke Machine Co., Holyoke, Mass.
A. Plamondon Mfg. Co., Chicago.

UNIFLOW ENGINES
Nordberg Mfg. Co., Milwaukee, Wis.

VACUUM PUMPS
The Nash Eng. Co., South Norwalk, Conn.

VACUUM SYSTEMS
Open Coil Heater and Purifier Co., Indianapolis, Ind.

VALVE FACING TOOLS
The Draper Mfg. Co., Port Huron, Mich.

VALVES
The Crane Co., Chicago.
G. M. Davis Regulator Co., Chicago.
Eastwood Wire Mfg. Co., Belleville, N. J.
Jenkins Bros., New York City.
Lunkenheimer Co., The, Cincinnati.
The Wm. Powell Co., Cincinnati.
Reading Steel Casting Co., Inc., Bridgeport, Conn.

VALVES (Air Compressor)
Hooven, Owens, Rentschler Co., Hamilton, O.

VALVES (Digester)
Eastwood Wire Mfg. Co., Belleville, N. J.

VALVES (Throttle)
Hooven, Owens, Rentschler Co., Hamilton, O.

VAPOR ABSORPTION SYSTEMS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
J. O. Ross Engineering Corp., New York City.
B. F. Sturtevant Co., Hyde Park, Boston.

VATS (Steel)
The Biggs Boiler Works Co., Akron, O.
Littleford Bros., Cincinnati.

VENTILATING SYSTEMS
American Blower Co., Detroit, Mich.
Arex Company, Chicago.
Bayley Mfg. Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
J. O. Ross Engineering Corp., New York City.
B. F. Sturtevant Co., Hyde Park, Boston.

VULCANIZERS
Biggs Boiler Works Co., Akron, O.

WASHER WIRES
Eastwood Wire Mfg. Co., Belleville, N. J.
The W. S. Tyler Co., Cleveland, O.
Wisconsin Wire Works, Appleton, Wis.

WASTE PAPER STOCK
Mendelson Bros. Paper Stock Co., Chicago.

WATER FILTER
Glens Falls Machine Co., Glens Falls, N. Y.
Hungerford & Terry, Inc., Clayton, N. J.

WATER-SOFTENING AND PURIFYING SYSTEMS
The Permutit Co., New York City.
Wm. B. Scaife and Sons Co., Oakmont, Pa.

WATER WHEELS
Holyoke Machine Co., Holyoke, Mass.
A. Plamondon Mfg. Co., Chicago.

WET MACHINES
Glens Falls Machine Works, Glens Falls, N. Y.
Valley Iron Works Co., Appleton, Wis.
Smith & Winchester Mfg. Co., So. Windham, Conn.

WHEELS (Sprocket)
Robins Conveying Belt Co., New York City.

WOOD GRAPPLES
Industrial Works, Bay City, Mich.

WOOD PIPE
The Michigan Pipe Co., Bay City, Mich.
A. Wyckoff & Son Co., Elmira, N. Y.

WOOD PRESERVATIVES
Detroit Graphite Co., Detroit, Mich.

WORM DRIVES
Cleveland Worm & Gear Co., Cleveland, O.

WORM GEARS
Foote Bros. Gear & Mach. Co., Chicago.

WIRE SIGNS
Cheney Bigelow Wire Works, Springfield, Mass.

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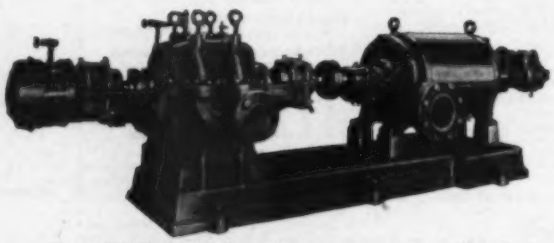

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